

AD-A205 167

PRE AND POST MODIFICATION  
ELECTROMAGNETIC COMPATIBILITY TEST REPORT  
FOR THE  
C-130H SELF CONTAINED NAVIGATION SYSTEM  
WITH MLS A-KIT

CONTRACT NO. F09603-85-C-1224

DATA ITEM 0105M

Report No. 6216-055-

20 January 1989

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PREPARED BY C. Snider  
DATE 89-1-18  
(TITLE) C. Snider  
Technical  
Writer

APPROVED BY [Signature]  
DATE 89-1-19  
TITLE L. Czewski  
Systems/EMC  
Engineer

APPROVED BY [Signature]  
DATE 89-1-19  
(TITLE) M. Wenzel  
Project  
Engineer

APPROVED BY P. Rhein  
DATE 89-1-19  
TITLE P. Rhein  
Test Lab  
Section Head

APPROVED BY [Signature]  
DATE 89-1-23  
(TITLE) P. Lewis  
System & Test  
Verification  
Section Head

APPROVED BY [Signature]  
DATE 89-1-25  
TITLE H. Stark  
Technical  
Director

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SLI AVIONIC SYSTEMS CORP.  
GRAND RAPIDS, MICHIGAN

Date January 27, 1989

State of Michigan  
County of Kent

P. Rhein, being duly sworn on oath, states that the data contained in SLI Avionic Systems Corp. Test Report No. 6216-055 are the results of carefully conducted tests and are, to the best of his knowledge, true and accurate in all respects.

P. Rhein  
P. Rhein, Manager,  
Environmental Test Laboratory

Subscribed and sworn to before me a notary in and for said county and state this  
27th day of January, 1989.

Sallie A. Alderink  
Sallie A. Alderink,  
Notary Public, Ottawa County, Michigan  
Acting in Kent County, Michigan  
My commission expires January 2, 1991

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- 1.0 **SPECIFIC TESTS** - The specific tests performed on the Self Contained Navigation System (SCNS) with MLS A-Kit, were a Pre-Modification Electromagnetic Interference (EMI) Signature of the aircraft equipment bays, flight deck and connecting wiring, followed by a Post-Modification EMI Signature and a functional compatibility test of the avionic systems with the SCNS system operating.
- 1.1 **FUNCTIONAL PURPOSE** - The tests performed were an engineering evaluation of post-installation EMI and Electromagnetic Compatibility (EMC) with existing electronic and avionic systems in the C-130H aircraft.
- 1.2 **TEST OBJECTIVES** - The test objectives were to verify the proper EMI/EMC design, installation, and operation of the associated C-130H aircraft subsystems prior to beginning flight test. This determines if the new installation, or the new or modified equipment would emit radiated or conducted EMI, and if emitted, whether the levels would create interference or degradation in existing equipment. The test was ran according to the EMI Test Program Plan ED1416, Appendix 2., and the EMC Program Plan ED1415, Appendix 1. *CRIT*
- 2.0 **SUMMARY** - In view of the results obtained by performing the Pre- and Post-Modification EMI Tests and the Post-Installation EMC Tests, it is concluded that the SCNS and associated installation is compatible with existing aircraft systems and does not degrade the electromagnetic signature and basic operation of the C-130H aircraft.
- 3.0 **SYSTEM/SUBSYSTEM DESCRIPTION** - The SCNS consists of three Integrated Control Display Units (ICDU), one Bus Integration Computer Unit (BICU), one Inertial Navigation System (INS), one Doppler Velocity Sensor (DVS) and the associated Group A wiring and installation kits.
- 3.1 **A-KITS** - The A-Kit consists of associated mounting adapters, control panels, cables, brackets, connectors and installation hardware.
- 3.2 **B-KITS** - The ICDUs were serial numbers 003, 004 and 021 with Operational Flight Program (OFP) 547974-18-01. The BICU was serial number 001 for radiated emissions testing and 067 for conducted emissions testing with OFP 547973-01-01. The INU was serial number 0073 while the DVS was serial number 1520/A.

**3.3**            **AIRCRAFT SERNO AND CONFIGURATION** - The C-130H used for the trial installation and test was C-130H Tail Number 80-0320.

**4.0**            **ABSTRACT** - This test program presents certified test data obtained in accordance with ED1416 and Contract No. F09603-85-C-1224.

Appendix 3 contains the EMI Log Data Sheets.

Pre-Modification baseline EMI tests were performed on February 3, 1988 at the Savannah Air National Guard Base to determine the test site background noise levels, and the signature of the operating electronic and avionics equipment prior to modification. On May 17, 1988 the tests were rerun to determine if measurable and identifiable interference signals could be found emanating from the new or modified equipment. System compatibility tests were then run to determine if any undesirable cross-coupling effects or degradation could alter the operation of the new or existing systems.

**5.0**            **REFERENCES** - The EMI/EMC requirements are described in document ED1415. The tests performed are described in document ED1416.

**6.0**            **FACTUAL DATA** - Pre and Post-Modification EMC tests were performed at Savannah Air National Guard Base. To obtain a reference for meaningful in-aircraft measurements, an ambient baseline was run with the EMI receiver on the left side of the aircraft under the flight deck with all aircraft power OFF for the Pre and Post-Modification tests. Separate measurements were then made on the aircraft with the basic electronic and avionics systems on and operational. Radiated and conducted emission signals in the selected regions were then measured and analyzed (in real time) for origin (baseline or new system), signal type (narrow-band, wide-band pulse), and amplitude or energy content. Equipment placement on the aircraft and other proximity effects were held as close as possible.

**6.1**            **TEST APPARATUS** - The tests were performed with the trial aircraft powered by mobile ground power units (electrical and air conditioning).

**6.1.1 TEST EQUIPMENT -**

- a. CP-105 Current Probe, AH. SYS., Devices, Inc.
- b. SAS-200 Vertical Antenna, Empire Devices, Inc.
- c. 7550 Spectrum Analyzer Serial Number 1185, IFR.

**6.1.2 EMC MEASUREMENT RANGE -** The frequency range of 0 - 30MHz was used.

**6.2 TEST PROCEDURES -** The tests performed are described in document ED1416.

**6.3 TEST RESULTS**

**6.3.1 PRE AND POST-MODIFICATION EMC COMPARISON -**  
Due to the environment these tests were conducted in, obtaining a realistic aircraft EMI Signature is difficult. Typical difficulties were ambient EMI emissions such as: low frequency NAV, AM broadcast stations, and Military HF emitters. Broadband noise sources included power generating equipment, motors, arc lamps, atmospherics, and hanger doors opening and closing. Because of these noise sources and IAW document ED1415 paragraph 3.2, no significant changes (greater than 12 dB) are expected or will be permitted between the Pre and Post-Modification measurements.

Post-installation data that was obtained that is within or lower than 12 dB of the pre-installation data should not cause an adverse effect on the system and system level EMC should be maintained. The rationalization for this statement is that the previous equipment worked in the environment and the environment has not been degraded in these areas. The newly installed equipment should be built IAW MIL-STD-461B and all pre-installation data was within the conducted and radiated susceptibility limits imposed by MIL-STD-461B.

The following is an analysis for the data taken during post-installation EMI scan which was significantly higher (greater than 12 dB) than the pre-installation EMI scan.



a. **CONDUCTED EMISSION SCAN** - This test was performed using a 7550 Spectrum Analyzer and the CP-105 Current Probe placed around 15 different power leads in the circuit breaker panel as detailed in ED1416 paragraph 4.1.4.1. Three photos were taken covering the frequency ranges of 0 to 1MHz, 1 to 10MHz and 10 to 30MHz for each power lead. Any differences between the Pre and Post-Modification tests greater than 12 dB are detailed below:

- (1) 115 VAC, Phase C, Essential Bus, Photo E2: Between 3.5 and 4.5 MHz, the post data was -70dBm which is about 17dB higher then the pre data.
- (2) 115 VAC, Phase B, Main Bus, Photo G1: Between 0.1 MHz and 0.2 MHz, the post data was from -20 dBm to -40 dBm which is about 20dB higher then the pre data.
- (3) 115 VAC, Phase C, Main, Photo H1: From about 160 kHz to 260 kHz, the post data was from about -40 dBm to -48 dBm which is up to 16 dBm higher than the pre data.
- (4) 115 VAC, Phase B, Right Hand Bus, Photo J3: At around 29 MHz, the post data was -72 dBm which is about 16dB higher then the pre data.
- (5) 28 VDC, Lighting, Photo O2: From 4 MHz to 6 MHz, the post data was -66 dBm which is about 20dB higher then the pre data.

Conclusions - The readings obtained above should not cause an adverse effect on the systems operation.

All onboard systems/subsystems should be built to withstand MIL-STD-461B Conducted Susceptibility Test CS02, which subjects the power leads to 1 volt which equates to 120 dBuV and 13 dBm. The highest reading above was a -20 dBm conducted emission level obtained which means that a 33 dB safety margin is present.

b. **RADIATED EMISSION SCAN** - This test was performed using a 7550 Spectrum Analyzer and a 41" Rod Antenna placed at 8 different locations as detailed in ED1416 paragraph 4.1.4.2. Three photos were taken covering the frequency ranges of 0 to 1MHz, 1 to 10MHz and 10 to 30MHz at each location. Any differences between the Pre

and Post-Modification tests greater than 12 dB are detailed below:

- (1) Pilot's station, Photo P2: At 9.2 MHz, the post data was -40 dBm which is about 32 dB higher than the pre. This increase is due to the area ambient.
- (2) Co-Pilot's station, Photo R2: From 1 MHz to 10 MHz, the post data was from -30 dBm to -55 dBm which is about 17 dB higher than the pre.
- (3) Co-Pilot's station, Photo R3: From 10 MHz to 30 MHz, the post data was from -40 dBm to -55 dBm which is about 20 dB higher than the pre.
- (4) Navigator's station, Photo S2: At 6 MHz, the post data was about -58 dBm which is about 17 dBm higher than the pre data.
- (5) Navigator's station, Photo S2: At 9.2 MHz, the post data was -35 dBm which is about 13 dB higher than the pre. This increase is due to the area ambient.
- (6) Right Hand, Underdeck, Inboard, Photo U1: At .68 MHz, the post data was about -59 dBm which is about 15 dBm higher than the pre data.
- (7) Right Hand, Underdeck, Inboard, Photo U2: At 9.2 MHz, the post data was -60 dBm which is about 14 dB higher than the pre. This increase is due to the area ambient.
- (8) Left Hand, Underdeck, Outboard, Photo W2: From 6 MHz to 10 MHz, the post data was from -45 dBm to -35 dBm which is about 15 to 20 dB higher than the pre. This increase is due to the area ambient.

Conclusions - The Post-Installation ambient was about 30dB higher around 9.2 MHz and about 18dB higher between 6-9 MHz. The ambient is the rational for all the radiated emission greater than 12dB in these frequency ranges.

The readings obtained above for the Co-pilot's station and Right Hand, Underdeck, Inboard should not cause an adverse effect on the systems operation for the following reasons:

- (1) The rod antenna was only about 4 inches away from the Co-Pilot's ICDU for the post data with respect to MIL-STD-461 RE02 required testing distance of 1 meter.
  - (2) Since all onboard systems/subsystems should be built to withstand MIL-STD-461B Radiated Susceptibility Test RS03, which subjects the equipment and cables to a 10 Volt/Meter E-Field which equates to 140 dBuV/m and 33 dBm. The highest radiated emission level obtained at the Co-pilot's station and Right Hand, Underdeck, Inboard was -30 dBm. Taking into account an antenna factor of -4 dB, a safety margin of 59 dB is present.
  - (3) Many agencies feel that the human body can be subjected 1 mw/cm\*\*2 which is equivalent to a 48 dBm field for an indefinite amount of time. Again, the highest radiated emission level obtained was -30 dBm. Taking into account an antenna factor of -4 dB, a safety margin of 74 dB is present.
- c. **AMBIENT** - This test was performed using a 7550 Spectrum Analyzer and a 41" Rod Antenna placed at the Pilot's station and on the left side of the aircraft under the flight deck with all aircraft power OFF for the Pre and Post-Modification tests. Three photos were taken covering the frequency ranges of 0 to 1MHz, 1 to 10MHz and 10 to 30MHz. Any differences between the Pre and Post-Modification tests are detailed below:
- (1) Pilot's station, Photo Q1: Similar.
  - (2) Pilot's station, Photo Q2: Similar except for 30dB higher around 9.2 MHz.
  - (3) Pilot's station, Photo Q3: Post lower by 15dB from 12 MHz to 18 MHz.

- (4) Left Hand, Underdeck, Outboard, Photo X1: Up to 23 dBm higher at .75 MHz and up to 14 dBm higher at .83 MHz.
- (5) Left Hand, Underdeck, Outboard, Photo X2: Up to 18dB higher from 6 MHz to 9 MHz.

**6.3.2**

**POST INSTALL EMC FUNCTIONAL COMPATIBILITY TESTS** - The functional compatibility tests were conducted IAW ED1416 paragraph 4.3.

During the test, no malfunctions occurred.

Conclusions - The Post-Modification EMC Functional Compatibility Test shows that there were no operational problems due to EMI to the C-130H aircraft after the installation of SCNS, with MLS A-Kit.

## APPENDIX 1

ED1415      Electromagnetic Compatibility Control Program Plan for the  
Self-Contained Navigation System with MLS A-Kit



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**SLI AVIONIC SYSTEMS CORP.**

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**ELECTROMAGNETIC COMPATIBILITY CONTROL PROGRAM PLAN**

**FOR**

**THE SELF CONTAINED NAVIGATION SYSTEM**


**WITH MLS A-KIT**

**ED1415**

**Contract No. F09603-85-C-1224**

**Data Item 0104M**

**Smiths Industries,  
SLI Avionic Systems Corp  
Grand Rapids, Michigan**

 **SMITHS INDUSTRIES**  
**SLI AVIONIC SYSTEMS CORP.**

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ELECTROMAGNETIC COMPATIBILITY CONTROL PROGRAM PLAN

FOR

THE SELF CONTAINED NAVIGATION SYSTEM

WITH MLS A-KIT

ED1415

Contract No. F09603-85-C-1224

Data Item 0104M

Smiths Industries,  
SLI Avionic Systems Corp  
Grand Rapids, Michigan




LEAR SIEGLER, INC.  
INSTRUMENT DIVISION

1741 EASTERN AVE. S.E. GRAND RAPIDS MI 49508



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## 1. SCOPE

The Self-Contained Navigation System (SCNS) provides integrated operation of the Doppler Velocity Sensor (DVS), Inertial Navigation System (INS), Integrated Computation and Display System (ICDS), and the associated installation Group A kit to provide navigation in the following modes; Independent INS, Independent Doppler and Integrated using Doppler aided Inertial, Inertial only, Doppler only and TAS/HDG sensors. It also provides control of the various C-130 communication/navigation (comm/nav) systems. The SCNS ICDS consists of three Integrated Control Display Units (ICDU) and one Bus Integration Computer Unit (BICU) for all C-130 aircraft except the HC-130 which will have an additional ICDU for the radio operation.

The MLS A-Kit provides the capability to integrate an ARINC Characteristic 727 compatible MLS Receiver Processor and four receiver antennas with the SCNS system. One antenna must have an integral preamplifier due to the long transmission length required; this antenna will be located at the rear of the fuselage.

1.1 Purpose. The purpose of the EMC plan is threefold:

- a. To delineate EMC requirements for the design, build, integration and test of SCNS components in order to provide first round compatibility with existing systems.
- b. To emphasize the administration and management of EMC efforts and requirements so that a. is accomplished.
- c. To provide a vehicle for analysis data and overall system EMC information.

1.2 Scope. The EMC plan is intended to comprehensively cover all facets of EMI and EMC requirements of the total SCNS system with MLS A-Kit (i.e., MLS B-Kit items are not included in this program plan). It ties together all independently listed requirements from EMI box testing to post-installation compatibility with existing systems. The plan either contains the supporting data or refers directly to other documents where necessary. The table of contents provides an outline of the total EMC plan. Requirements of MIL-E-6051D, paragraph 3.3 are met.



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## 2. APPLICABLE DOCUMENTS

**2.1 Government documents.** The following documents form a part of this document to the extent specified herein. In the event of a conflict between the referenced documents and this document, the requirements of this document shall govern.

### SPECIFICATIONS:

#### Military

MIL-E-6051D

Electromagnetic Compatibility Requirements, System (paragraph 3.3)

### STANDARDS:

#### Military

MIL-STD-461B

Electromagnetic Interference Characteristics, Requirements for Equipment (applicable sections)

#### Data Item Descriptions

DI-R-7061

Electromagnetic Interference Control Plan (current IAW MIL-STD-461B)

DI-T-3718A/M

Test Reports - General

M1072

Class II Mod Wiring Identification

**2.2 Non-Government documents.** The following documents form a part of this document to the extent specified herein. In the event of a conflict between the referenced documents and this document, the requirements of this document shall govern.

#### SLI Avionic Systems Corp. (SLIASC)

ED1310

Electromagnetic Interference Test Plan for SCNS LRUs.

ED1416

Electromagnetic Interference Test Plan for the SCNS with MLS A-Kit aircraft installation.



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### 3. EMC CONTROL PROGRAM DESCRIPTION

**3.1 EMC plan.** The EMC plan is the starting point for the EMC control program. The EMC plan purpose, scope, etc., is described in section 1. The plan ties the EMC program together. The EMC plan is prepared IAW the requirements of MIL-E-6051D, paragraph 3.3 and DI-R-7061. MIL-STD-461B is also referenced in the Military Standards list of the SOW.

**3.2 Electromagnetic Interference Test Plan for the SCNS/MLS A-Kit aircraft installation (SLIASC ED1416).** This document is used as a deliverable test plan describing those EMI tests to be performed on the C-130H aircraft. This same document is used as a test procedure to check proper function of the completed and installed system. Prior to system installation in the C-130H, the aircraft will be checked for existing electromagnetic signature in the equipment bays, flight deck, and connecting wiring that will be disturbed by the installation. Following installation of the SCNS with MLS A-Kit (not including B-Kit), the signature will again be checked, first with the new equipment not operating, then with it operating. No significant changes (greater than 12dB) are expected or will be permitted. The last test in the procedure consists of a functional compatibility test of the avionics systems with the SCNS system operating. No interference or degraded operation is to be permitted for either the old or new equipment.

**3.3 Electromagnetic Interference Test Plan for the SCNS LRUs (SLIASC ED1310).** This document is used as a deliverable test plan describing those EMI tests to be performed on the new equipment; the ICDU, the BICU, and the DVS. The same document is used as a test procedure in the conducting of the actual EMI tests on the subsystem LRUs. The testing is done to verify that the SCNS LRUs meet the applicable requirement of MIL-STD-461B and will not emit or be susceptible to frequencies that would jeopardize system compatibility.

**3.4 EMC verification test final report.** The results of the tests of paragraph 3.2 will be prepared in report form IAW the requirements of DI-T-3718A and will be identified as CDRL item 0105(M). DI-R-7062, as referenced in MIL-STD-461B, will also be used as a report writing reference.



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#### 4. ADMINISTRATION/MANAGEMENT OF THE EMC CONTROL PROGRAM

The control program is organized IAW methods and requirements of MIL-E-6051D as applicable to the size and complexity of the SCNS/MLS A-Kit.

**4.1 Organization.** EMI testing (box and subsystem levels) is performed by personnel of the SLIASC Engineering Environmental Laboratories. EMI personnel are full-time, and test the equipment from all ongoing projects. Within the specific program or project, such as SCNS/MLS A-Kit, a systems engineer is responsible for the overall EMC program. The engineer is a member of the project team assigned to the SCNS/MLS A-Kit program but is administratively a member of the Military Systems Department. The EMC engineer is responsible for all procedures, tests, and test reports.

**4.2 Personnel experience.** The personnel assigned to the SCNS/MLS A-Kit EMC program are:

- a. System EMC engineer. Electronics Engineer from the SLIASC Military Systems Dept. He has over 8 years experience in the aerospace industry in electronic design and systems engineering. He has done EMC studies and tests on the baseline SCNS system, Navigation Attack Systems and several A-Kit installations on a multiple of different military aircraft. The system EMC engineer will monitor and supervise EMI and compatibility as required.
- b. EMI test engineer. Senior EMC test engineer and full-time member of the SLIASC Engineering Environmental Laboratories staff. He has performed and/or directed testing on all programs requiring EMI testing at SLIASC for the past 17 years. He is responsible for the EMI screen room and the test equipment procured for use therein. He is a member of the EMI DB society and is an EMI consultant to the Society of Automotive Engineers.
- c. Field test engineer. Senior Environmental test technician. He has over 15 years experience in all types of Environmental Laboratory qualification test programs. He assists the EMC test engineer as required in EMI laboratory testing. He has performed many field EMI tests for EMI pre- and post-installation signature definition. Representative programs include the F-4E and RF-4C AN/ARN-101 retrofit program, the QSR RF-4C program, the TEREK DFS program, and the F-4E ECCM program.



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#### 4.3 Personnel responsibilities.

- a. The EMC System Engineer has the responsibility of coordinating the overall EMC program, preparing test procedure requirements, monitoring tests, analyzing equipment, systems and results, and writing reports.
- b. The EMI Test Engineer is responsible for the EMI environmental test facility, equipment, calibration status, providing of proper EMI test equipment, and performance of the laboratory level testing. The EMI Test Engineer also analyzes the test results, corrects for calibration factors and provides certified records and results for the EMI test report.
- c. The Field Test Engineer is responsible for performing the EMI signature tests aboard the aircraft. He will work closely with the EMC System Engineer and the aircraft test crew. He will record data, have it certified, and prepare it for inclusion in the EMC report.

**4.4 Authority.** Overall responsibility for the EMC program is vested in the EMC Systems Engineer. Authority for required action based on the EMC Engineer's findings is through the SCNS Technical Director.

**4.5 Schedule.** See figure 1 for the EMC scheduling.

**4.6 Control of subcontractors.** Results of EMI tests from the DVS manufacturer will be reviewed.

**4.7 EMC board.** There is no requirement for an EMC board.

**4.8 GFE equipment EMI control.** Control of potential problems of EMI from GFE equipment will be handled as follows:

- a. Results of EMI tests from the INU manufacturer will be reviewed.
- b. An analysis of interconnect cable and LRU chassis design will be made to anticipate any incompatibilities. Pre- and post-installation testing will verify compatibility of all systems. No serious problems are anticipated, and it is believed that any minor incompatibilities that do appear can be handled without modification of GFE equipment.

**4.9 Control of revisions to this EMC plan.** Any changes or revisions to the EMC plan or program will be documented as Addenda to this plan and handled through the ECO path.



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	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV
Final EMC Control Plan		▽									
C-130H Trial Install	▽			▽							
Pre Install Scan	▽										
LRU Tests				▽	▽						
Post Install Scan					▽						
EMC Verification					▽						

Figure 1. EMC Scheduling

Any equipment design changes or procedure changes will be reviewed for impact on EMC and will have to be approved by the EMC System Engineer.

## 5. SYSTEM/SUBSYSTEM DESCRIPTION

There will be one SCNS/MLS A-Kit demonstration system. This will be in the C-130H airframe. The C-130H System will consist of three ICDUs, one BICU, the DVS, the INU, the MLS A-Kit, and the rest of the Group A wiring and installation kit.

**5.1 Aircraft installation.** The SCNS installation from an EMC point of view is described as follows. The INU, the BICU, and a SCNS relay panel will be installed in the electronic control and supply rack under the aft center of the flight deck. Just aft of this rack, on the underside of the fuselage, the DVS will be mounted. The pilot's, copilot's, and navigator's ICDU will be installed in their respective stations. Cabling will be added under the deck to pilot's ICDU. The cabling to the remaining ICDUs will come through the aft end of the flight deck and will extend forward along the right side of the aircraft.

The MLS A-Kit installation from an EMC point of view is described as follows. Both MLS Receiver Processors mounting trays and two splitters will be able to be installed in the center underdeck rack. The required data bus couplers will also be located in the center underdeck rack. The MLS Relay Panel will be installed in the underbunk flight deck. Coaxial cables will be installed from the receiver mounting trays to the following four locations; under the



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nose radome, on the top of the forward fuselage, and on the rear lower fuselage. Cabling will be added under the deck for all of the interfaces described above.

**5.2 A-Kits.** The A-Kits consist of cables, brackets, connectors, switches and installation hardware. The only items of interest from the EMC standpoint are the interconnect cables and connectors.

**5.3 B-Kits.** The B-Kits consist of the ICDUs and BICUs, the DVSS modified to interface with a MIL-STD-1553B Bus, and the GFE INS and Radio Control Heads.

**5.4 Aircraft serial numbers and configurations.** There will be one C-130H type into which the trial installation will be made:

- (1) A late C-130H.

This configuration will give adequate representation for the five C-130 SCNS installations. The exact tail number of the aircraft selected for trial installation is 80-0320.

## 6. TESTING

The aircraft testing will be performed at Savannah, GA on the ramp or in a large EMI quiet hanger. A pre-modification EMI signature scan will be performed in several selected locations in the various flight stations and in the equipment locations below the flight deck. The scan will be performed with all systems in operation. Local stray sources of EMI (not of aircraft origin) will be identified for comparative purposes for the post-mod test. This relieves the test from being compromised by local strong signals. Post-installation systems compatibility will also be performed to ensure that no disturbed systems, undisturbed systems, or newly installed systems are mutually adversely affected. Experienced EMI field test personnel from the SLIASC Environmental Laboratory will perform the tests under direction of the SCNS EMC Engineer.

**6.1 Equipment to be used.** Equipment listed in Table I or equivalent equipment will be used in the aircraft field test measurement.

## 7. DESIGN METHODS

**7.1 SCNS LRU chassis.** Each SCNS chassis will form an EMI-tight enclosure for the circuitry contained within it. The only openings will be cooling air metering holes whose size is small and whose electrical resonant frequency is well beyond the range of concern. Removable chassis covers will



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Table I. Field EMC Test Equipment

QUANTITY	IDENT	DESCRIPTION
1	CP105	Current Probe - Empire Devices, Inc.
1	LO105	Magnetic Field Probe - Empire Devices, Inc
1	SAS-200	Vertical Antenna - Empire Devices, Inc.
1	H133C/AIC	Headset
1	--	Polaroid Land Camera
1	A-7550	Digital Spectrum Analyzer IFR., Inc.

have electrically clean, low inductance, metal-to-metal contact to the chassis. RF gasketing will be used where necessary.

**7.2 Cabling.** Data Transmission between boxes within the SCNS/MLS A-Kit system will be on MIL-STD-1553B buses. These transmissions will be carried on shielded twisted pairs. This will effectively attenuate the radiated emissions from the necessarily fast rise time signals on the buses. Other digital inputs and outputs will be transmitted on twisted pairs connecting differential line drivers and receivers. The twisted pairs will be covered, either singly or severally, with a braided shield. This shield forms an extension of the chassis in which the signals originate and/or terminate. Power, relay control discretes, and analog signals will be analyzed individually to determine routing and shielding requirements. Semirigid, foam dielectric, or double shielded coaxial cable will be utilized for radio frequency transmissions from MLS receiver antennas to the MLS receiver processors.

**7.3 Grounding.** Each chassis will be connected to airframe ground through its mounting structure or by a redundant grounding terminal. A chassis grounding wire will also be connected from the chassis to a dedicated pin in the power connector. Signal and internally generated power will be isolated from the chassis in which they originate and from the prime power. In this way, return lines can be connected to their source at a single secondary ground point.

**7.4 Power supplies.** In each chassis containing a power supply, the primary power will be isolated from the chassis, secondary power, and signal returns by the use of a transformer coupled inverter. The primary power and their returns will be allocated isolated pins in the power connector.



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## 8. METHODS OF IMPLEMENTING DESIGN CHANGES

All design changes, as well as original design documentation, is to be reviewed for impact on EMC control. EMC engineer signoff will be required on all ECOs to drawings, and test procedures.

## 9. DESIGN AND DEVELOPMENT TESTING

The SCNS LRUs were laboratory EMI tested at SLIASC. The test plan and procedure SLIASC Document No. ED1310 covers these tests and should be referred to for more detail. Table II summarizes the MIL-STD-461B tests conducted.

Table II. Applicable MIL-STD-461 Test Methods

SHEET NUMBER	TEST TO BE PERFORMED IAW MIL-STD-461	DESCRIPTION	MIL-STD-461B, PART 2 PARAGRAPH
34	CE03	Conducted emissions, broad band, and narrow band, 15 kHz - 50 MHz power leads	3.0
34	CE07	Conducted switching transients	5.0
40	CS06	Conducted susceptibility spike, power leads	11.0
45	RE02	Radiated emissions, broad band 14 kHz to 1 GHz and narrow band 14 kHz to 10 GHz	15.0
50	RS02	Radiated susceptibility, mag induction fields spikes and power line frequency	18.0
53	RS03	Radiated susceptibility 14 kHz - 10 GHz	19.0



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## APPENDIX 2

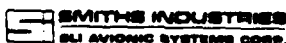
ED1416      Electromagnetic Interference test Program Plan for the Self-  
              Contained Navigation System (SCNS) with MLS A-Kit SLIASC  
              Models 6216A, 6216B, 6216C



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**ELECTROMAGNETIC INTERFERENCE TEST  
PROGRAM PLAN  
FOR THE  
SELF-CONTAINED NAVIGATION SYSTEM (SCNS)  
WITH MLS A-KIT  
SLIASC MODELS 6216A, 6216B, 6216C  
AIRCRAFT INSTALLATION  
ED1416**

**Contract No. F09603-85-C-1224  
Data Item 0104M  
Smiths Industries  
SLI Avionic Systems Corp.  
Grand Rapids, Michigan**



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REVISIONS																	
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REV	-	-	-	-													
SH	14	15	16	17													
NOTICE: THE ABOVE SHEETS CONSTITUTE APPENDIX I OF THIS VOLUME.																	
REVISION STATUS OF SHEETS	REVISION SHEET	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
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SYS	<i>[Signature]</i>		28-3-88														
CHKR																	
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TECH Dwg	<i>[Signature]</i>		4-29-88														
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ELECTROMAGNETIC INTERFERENCE TEST PROGRAM PLAN																	
SELF-CONTAINED NAVIGATION SYSTEM (SCNS) WITH MLS A-KIT AIRCRAFT INSTALLATION																	
CONTRACT NO. F09603-85-C-1224																	
Data Item 0104M (SLIASC MODEL 6216A)																	
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## 1. SCOPE

This plan describes the EMI tests to be performed on the C-130 Self-Contained Navigation System (SCNS) with MLS A-Kit Aircraft Installation. The SCNS provides integrated operation of the Doppler Velocity Sensor (DVS), Inertial Navigation System (INS), Integrated Computation and Display System (ICDS) and the associated installation Group A kit to provide navigation in the following modes; Independent INS, Independent Doppler and Integrated SCNS. It also provides control for various C-130 communication/navigation (COMM/NAV) systems. The SCNS ICDS consists of three Integrated Control Display Units (ICDU) and one Bus Integration Computer Unit (BICU) for all C-130 aircraft except the HC-130 which will have an additional ICDU for the radio operator.

The MLS A-Kit provides the capability to integrate an ARINC Characteristic-727 compatible MLS Receiver Processor and four receiver antennas with the SCNS system. One antenna must have an integral preamplifier due to the long transmission length required; this antenna will be located at the rear of the fuselage.

**1.1 Purpose.** The purpose of the test is to determine that the addition of the SCNS/MLS A-Kit does not result in measurable degradation to any existing non-disturbed or disturbed system. The test also verifies that existing systems have no adverse effect upon the added equipment and its functions.

**1.2 Item descriptions.** The items to be submitted for testing will be the SCNS/MLS A-Kit installations on one trial aircraft. Pre-installation and post-installation EMI tests will be used to determine the presence, or to verify the absence, of electromagnetic mutual interference between existing and new or modified systems present on the C-130H aircraft. The tests will be performed at Savannah, Georgia.

### 1.2.1 Pre-installation test.

- a. Measure EMI signature of the pre-modification aircraft by monitoring conducted EMI on a power cable to equipment which will not be disturbed by the modification.
- b. Measure radiated EMI at each crew station and in equipment bays.

**1.2.2 Post-installation test.** The system will have undergone and passed the tests IAW the pre- and post-modification checkout from table I.



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Table I. Pre- and Post-Modification Checkout

TEST PROCEDURE	APPLICABLE AIRCRAFT
PC1091	C-130H (Late)

- a. Apply power to the SCNS subsystem and repeat the tests of 1.2.1 a. and 1.2.1 b. with added SCNS subsystems and MLS A-Kit installed.
- b. With all on-board systems operating, check functional compatibility between existing systems and new and disturbed systems.

## 2. APPLICABLE DOCUMENTS

**2.1 Government documents.** The following publications, specification, and procedures are applied to this procedure to the extent specified herein.

Military Specifications (Ref.)

MIL-E-6051D      Electromagnetic Compatibility Requirements,  
System

Military Standards (Ref.)

MIL-STD-461B      Electromagnetic Interference Characteristics  
Requirements for Equipment

**2.2 Non-Government documents.** The following document is applicable to the extent specified herein.

SLI Avionic Systems Corp.

PC1091      Field Test Procedure, Pre- and Post-Installation and  
Checkout, SLIASC Model 6216A Self-Contained  
Navigation System for the C-130H (Late) Aircraft

## 3. REQUIREMENTS

**3.1 EMI equipment or equivalent, contractor-furnished.**

1	CP-105	Current Probe - Empire Devices, Inc.
1	LO-105	Magnetic Field Probe - Empire Devices, Inc.
1	SAS-200	Vertical Antenna - Empire Devices, Inc.



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- 1 H133C/AIC Head set (or Empire EA-105)
- 1 - Polaroid Land Camera
- 1 7550 Spectrum Analyzer - IFR, Inc.

**3.2 Aircraft systems test sets.** (Air National Guard supplied.) Simpson 260 multimeters as required. Pressure Temperature Test set with pilot static adapter.

**3.3 Test conditions.** Tests in this procedure are to be performed at ambient temperature and pressure on the ramp or in a large interference quiet hanger at the Air National Guard in Savannah, Georgia. The area should be as isolated as possible from local noise sources. Do not use metal-framed sun or rain shelters.

**3.4 Personnel requirements.**

- EMI Test Engineer
- Systems Engineer
- SLIASC Installation Personnel as required for support
- Air Force technicians as required to remove electro-explosive devices and to perform engine operation.

For tests prior to installation, an EMI Engineer and a Test Technician will perform and record tests. They will be aided by the installation personnel who are on site for aircraft acceptance.

The EMI monitoring tests performed after the installation will be performed by SLIASC personnel using a Systems/EMI Engineer and a Test Technician. They will be aided by SLIASC personnel who are on site to conduct checkout and post-installation tests.

Performance of the post-installation operating functional compatibility tests will be done by SLIASC personnel with support from Air Force technician personnel.

**3.5 Test data sheets.** Samples of test data sheets are provided in Appendix II.

All entries shall be made using a ballpoint pen (fine, black). Any corrections shall be made by drawing a single line through the item to be deleted, writing in the correction, and initialling by the test operator. The



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Systems Engineer shall sign the bottom of each page to certify correctness and completeness. Start and stop times shall be recorded.

**3.6 Aircraft and systems operating status.** All tests will be performed using ground power and cooling units.

### 3.7 Precautions.

**3.7.1 Electro-explosive or other initiator explosive devices.** All such devices will be removed from the aircraft prior to accomplishment of any of the following tests.

**3.7.2 Ground operations safety warnings.** Consult the relevant T.O.s covering specific systems operating during these tests. Allow only qualified personnel to operate the systems or to be in close proximity during operation and test.

## 4. TEST PROCEDURE

### 4.1 Pre-installation EMI scan.

**4.1.1 Test configuration.** Locate the aircraft on the ramp or in a quiet hanger as far from local noise sources as possible. Auxiliary electrical power and air conditioning shall be used. Assure that all grounds have been properly attached.

**4.1.2 Power ON.** Apply electrical power and cooling to the aircraft IAW standard procedures.

NOTE: (No hydraulic power is to be applied, unless called for in the particular procedure).

Verify that external power voltages and frequency are in specification. Record values on data sheet.

**4.1.3 Systems ON.** Turn on the following systems IAW applicable procedures and Technical Orders.

ARC-190 HF Radio System #1  
ARC-190 HF Radio System #2  
ARC-186 VHF Radio System #1  
ARC-186 VHF Radio System #2 where installed  
ARC-164 UHF Radio System #1  
ARC-164 UHF Radio System #2 where installed  
ARN-118 TACAN System #1



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ARN-118 TACAN System #2 where installed  
 ARN-127 VOR/ILS System #1 or standard VOR/ILS  
 ARN-127 VOR/ILS System #2 or standard VOR/ILS where installed  
 Intercomm System  
 ARN-169 SKE Equipment where installed  
 MA-1 Flight Director Group where installed  
 APQ-122 Radar where installed  
 APN-133 Radio Altimeter where installed  
 APN-59 Search Radar where installed  
 IFF Equipment  
 N-1 Compass System where installed  
 ARN-67 Glideslope Receiver  
 Public Address System  
 C-12 Compass System where installed  
 Air Data System  
 Automatic Flight Control System where installed  
 Other systems at the discretion of the EMI engineer  
 FCS-105 Flight Director System where installed  
 USAF Standard Flight Director System where installed

#### 4.1.4 Measurements.

4.1.4.1 *Conducted noise on power lines.* Measure conducted noise (both narrowband and wideband) in the circuit breaker panel on power leads from the following systems:

- a. DC Essential Bus
- b. 26 VAC, 400 Hz, ØA Reference Bus
- c. 115 VAC, 400 Hz, ØA Essential Bus
- d. 115 VAC, 400 Hz, ØB Essential Bus
- e. 115 VAC, 400 Hz, ØC Essential Bus
- f. 115 VAC, 400 Hz, ØA Main Bus
- g. 115 VAC, 400 Hz, ØB Main Bus
- h. 115 VAC, 400 Hz, ØC Main Bus
- i. 115 VAC, 400 Hz, ØA RH AC Bus
- j. 115 VAC, 400 Hz, ØB RH AC Bus
- k. 115 VAC, 400 Hz, ØC RH AC Bus
- l. 115 VAC, 400 Hz, ØA LH AC Bus
- m. 115 VAC, 400 Hz, ØB LH AC Bus
- n. 115 VAC, 400 Hz, ØC LH AC Bus
- o. 0-28 VDC Aircraft Lighting Bus



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Use the CP105 current probe and the 7550 Spectrum Analyzer (see 3.1) to measure both narrowband and wideband noise in the band of 0.15 to 25 MHz while all on-board equipment is being operated.

**4.1.4.2 Radiated noise.** Radiated noise will be measured in these locations in the aircraft; the pilot's station, the copilot's station, the navigator's station, and at least four locations around the electronic control and supply rack under the flight deck. Consult illustrations of post-installation equipment location and place EMI measuring antennae in a manner that can be repeated during the post-test measurements. Photograph the setup each time an antenna is changed.

Measure the narrowband and wideband radiated noise from each location over the band width of 0.15 to 25 MHz while all on-board equipment is being operated. Use the appropriate probe LO-105 or antenna VA-105 and the 7550 Spectrum Analyzer.

Identify any signals not originating in the aircraft (such as local broadcast station, etc). Photograph the test setup. Use data sheet as in Appendix II.

**4.2 Post-installation EMI scan.** The post-installation EMI scan shall be performed with each SCNS subsystem and MLS A-Kit installed. The order of tests is not important, but each data sheet shall convey the SCNS subsystem type and equipment serial numbers. The aircraft and support equipment shall be in the same locations as during the pre-modification scan.

Repeat 4.1 with the +28 VDC and 115 VAC circuit breakers closed and the SCNS powered up.

**4.3 Post-installation EMC functional compatibility tests.** In this test, all aircraft equipments will be operated and exercised as specified herein. Each of the aircraft subsystems will be operated and monitored to determine if interference exists. Record results on a Test Matrix Sheet as shown in Appendix II. Checkoff test results placing (OK) in box if no interference occurs. Use (✓) if interference occurs and narrate details on the Narrative Report Sheet.

**4.3.1 Test configuration.** The aircraft shall be completely reassembled, with all doors and panels closed and secured. This test may be performed in a hanger or on the ramp. Observe the proper safety precautions.

**4.3.2 Monitoring methods for victim subsystems.** The following monitoring methods will be used to determine if a subsystem is the victim (V) of another



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subsystem's operation. The operating modes of each subsystem which will be used to generate noise are described in 4.3.3.

(V-1) SCNS - The following behaviors correlated to operation of other systems may indicate interference with SCNS operations:

a. ICDU

- (1) Jumpy displays
- (2) Fuzzy traces
- (3) Loss of sync
- (4) Random change of displayed page
- (5) Reversion to start-up page
- (6) Other erratic behavior at the discretion of the EMI/Systems Engineer.

b. BICU

- (1) Erratic behavior of APQ-122 Radar
- (2) Erratic behavior of flight director instruments in SCNS mode
- (3) Other erratic behavior at the discretion of the EMI/Systems Engineer.

c. DVS

- (1) Erratic data

d. INU

- (1) Erratic data
- (2) Inability to align
- (3) Erroneous alignment

(V-2) Radar - The installed radar will be operated at 10-mile range. Operation will be monitored at both the pilot/copilot's display and the navigator's display. Jittering, fuzziness, or rolling correlated to operation of SCNS indicates interference.

(V-3) Radar Altimeter - Erratic altitude output correlated to SCNS operation indicates interference.

(V-4) Communication Equipment (UHF, VHF, HF) - The communication receivers will be turned on and the volume control adjusted to a normal level.



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A test operator will wear a headset and determine interference by correlating headset noise to the operation of SCNS.

(V-5) Tacan - The Tacan subsystem will be operated and locked on to a local Tacan Station. Bearing and Distance will be monitored on the BDHI. Significant changes of bearing and distance, which can be correlated with SCNS operation, will indicate interference.

(V-6) ADF - The ADF will be tuned to a local operating station. Bearing indication will be monitored on the BDHI. Significant changes of bearing, which are correlated with the operation of SCNS will be an indication of interference.

(V-7) AFCS - The AFCS will be operated with hydraulics on the aircraft. The AFCS will be engaged (pitch, roll, and yaw) and surface movement monitored. Transient movement of the surfaces, which are correlated with SCNS operation, or disengagement of Autopilot functions, will be an indication of interference.

(V-8) Compass System - The compass system will be operating in the slaved mode. The HSI and compass indicators will be monitored for changes of heading. Significant changes correlated with SCNS operation will indicate interference.

(V-9) Attitude System - The pilot's and co-pilot's ADIs will be monitored for pitch or roll changes. Significant changes correlated with SCNS operation will indicate interference.

(V-10) Air Data System - Using a Test Set, introduce an altitude of 10,000 feet and an airspeed of 250 kts. Observe the altitude, airspeed, and air temperature on one of the ICDUs while operating the SCNS from one of the other ICDUs. Significant changes correlated with SCNS operation will indicate interference.

(V-11) Electro-Explosive Devices - Electro-explosive devices will be removed and replaced by a meter. No measurable voltages should occur.

(V-12) SKE - Observe the pilot's display indicator and the Flight Command Indicator. Significant jitter or clutter on the pilot's indicator or changes of status on the Flight Command Indicator correlated with the SCNS operation will indicate interference.



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**4.3.3 Interference sources.** The interference sources (S) are those items added and those disturbed. They are as follows:

Pilot's ICDU	Added
Copilot's ICDU	Added
Navigator's ICDU	Added
Radio operator's ICDU where installed	Added
BICU	Added
DVS	Added
INU	Added

Other systems will be checked only as interference sources to the SCNS.

(S-1) SCNS - The SCNS will be powered by a standard pre-mission startup.

(S-2) Radar - The radar will normally be used in the Mapping mode for monitoring during test; however, all modes and ranges will be exercised for effect on the SCNS (observe all radar safety precautions).

(S-3) Communication Radios - Monitoring points shall be observed while the communication radio transmitters are exercised. Quality of the voice communications shall be monitored by the transmitter operator. Transmission frequencies for monitoring quality of communication will be dependent on the availability of ground stations. The transmitters shall be operated at several frequencies to test interference with SCNS. The frequencies shall be selected from the lower, middle, and high section of each band. Communications need not be established for these frequencies.

(S-4) Tacan - Tacan will normally be operating while locked to a local station to establish that it is not an interference source to SCNS.

(S-5) ADF - The ADF will be operated in the normal mode to assure that it is not a source of interference for newly installed SCNS.

(S-6) AFCS - No specific source-of-interference tests will be performed on the AFCS. The autopilot shall be operating.

(S-7) Radar Altimeter - The Radar Altimeter will be operated to monitor its performance during the tests. The system will be operated in the normal and test modes to establish that it is not a source of interference for newly installed SCNS.

(S-8) Compass Systems - No special tests will be made to establish the Compass Systems as sources of interference.



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SLI AVIONIC SYSTEMS CORP.

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<b>A</b>	<b>35351</b>
SCALE	NONE

DOCUMENT NO.  
ED1416

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(S-9) Flight Director Computer - No specific source-of-interference tests will be performed on the FDC.

(S-10) Air Data System - The Air Data System will be operating throughout the tests. No specific test will be performed to establish the Air Data System as an interference source.

(S-11) Flaps - The SCNS will be monitored while the flaps are raised and lowered.

(S-12) Auxiliary Power - The SCNS will be monitored while auxiliary power units are turned on and off.

(S-13) Bleed Air - The SCNS will be monitored while bleed air valves are turned on and off.

(S-14) Anti-Ice - The SCNS will be monitored while anti-ice controls are turned on and off.

(S-15) Trim - The SCNS will be monitored while trim surfaces are positioned by cockpit trim switches.

(S-16) Cargo Doors - The SCNS will be monitored while each cargo door is opened and closed in turn.

(S-17) Winches and Conveyors - The SCNS will be monitored while cargo handling winches and conveyors are being operated.

(S-18) Other Sources - Other potential sources of interference may be identified by the EMI engineer. The SCNS will be monitored while these sources are exercised through their operating cycles.



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APPENDIX I

EMI REFERENCE LEVELS

Figure 1. Reference Levels for Conducted Emissions, Narrowband (MIL-STD-461B, CE03 ref. source).

Figure 2. Reference Levels for Conducted Emissions, Broadband (MIL-STD-461B, CE03 ref. source).

Figure 3. Reference Levels for Radiated Emissions, Narrowband (MIL-STD-461B, RE02 ref. source).

Figure 4. Reference Levels for Radiated Emissions, Broadband (MIL-STD-461-B, RE02 ref. source).

REV

-

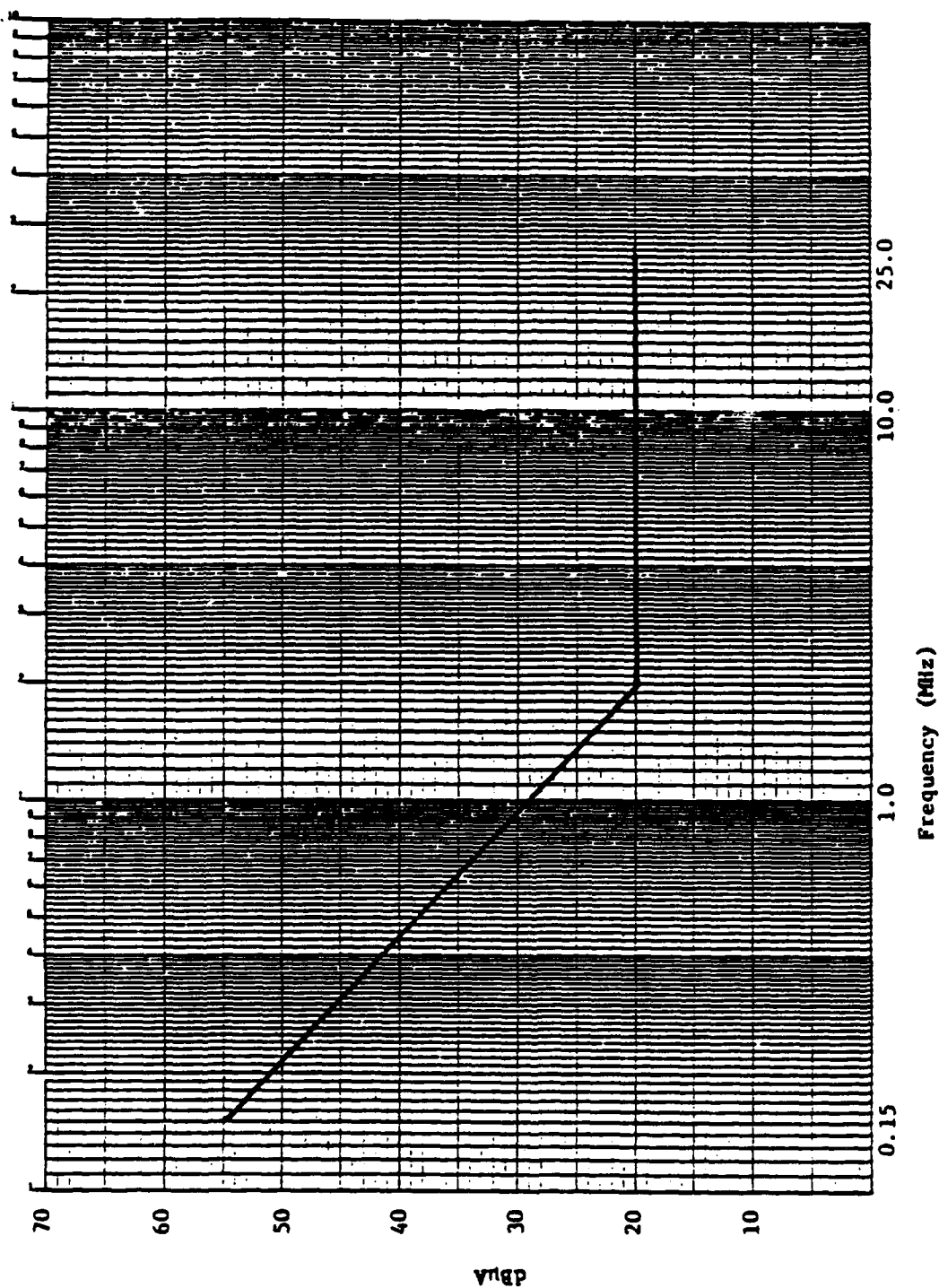


Figure 1. Reference Levels for Narrowband Emissions (CEO3)

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NONE

DOCUMENT NO.

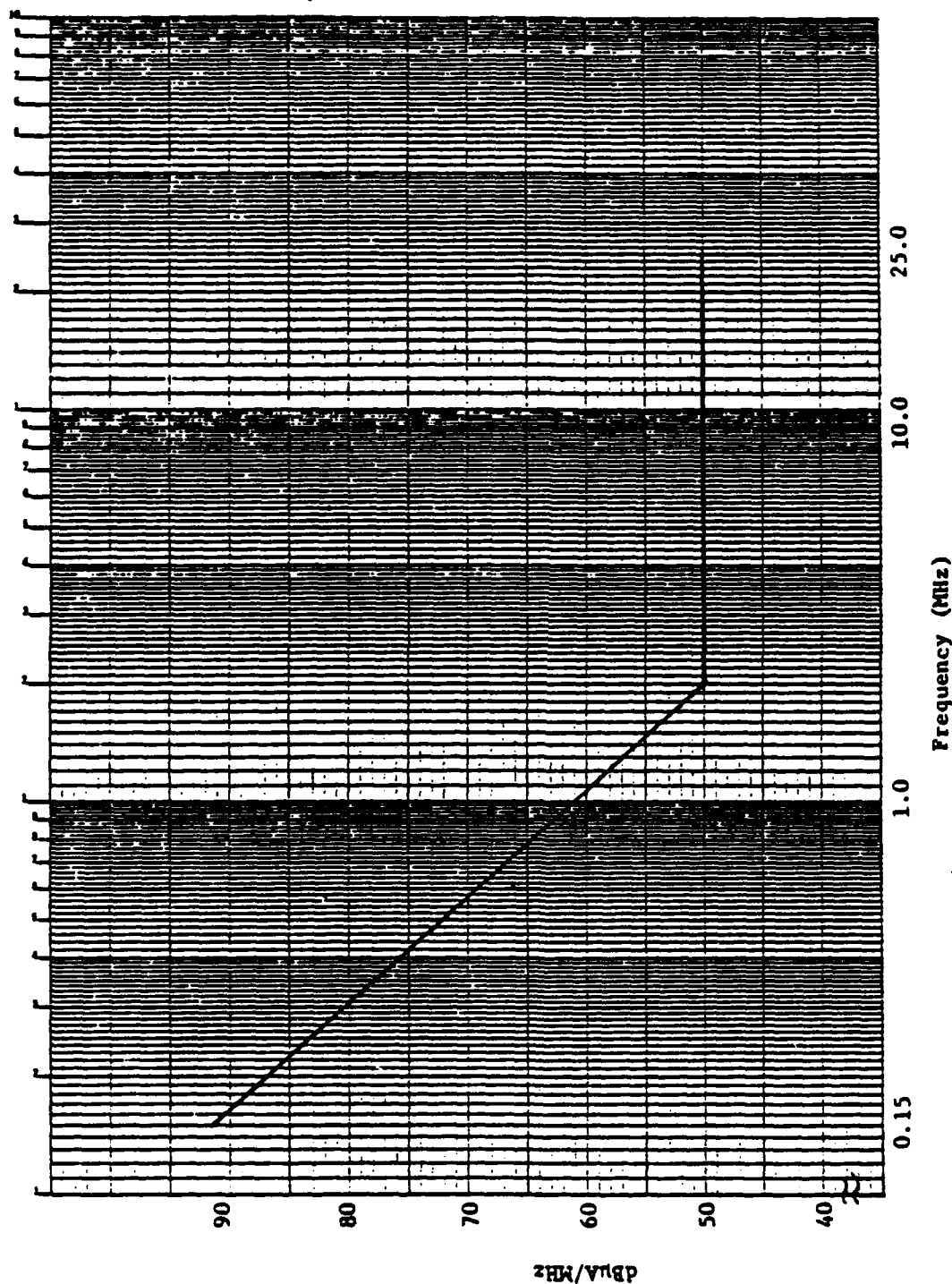
ED1416

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-



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CAGE CODE

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SCALE

NONE

DOCUMENT NO.

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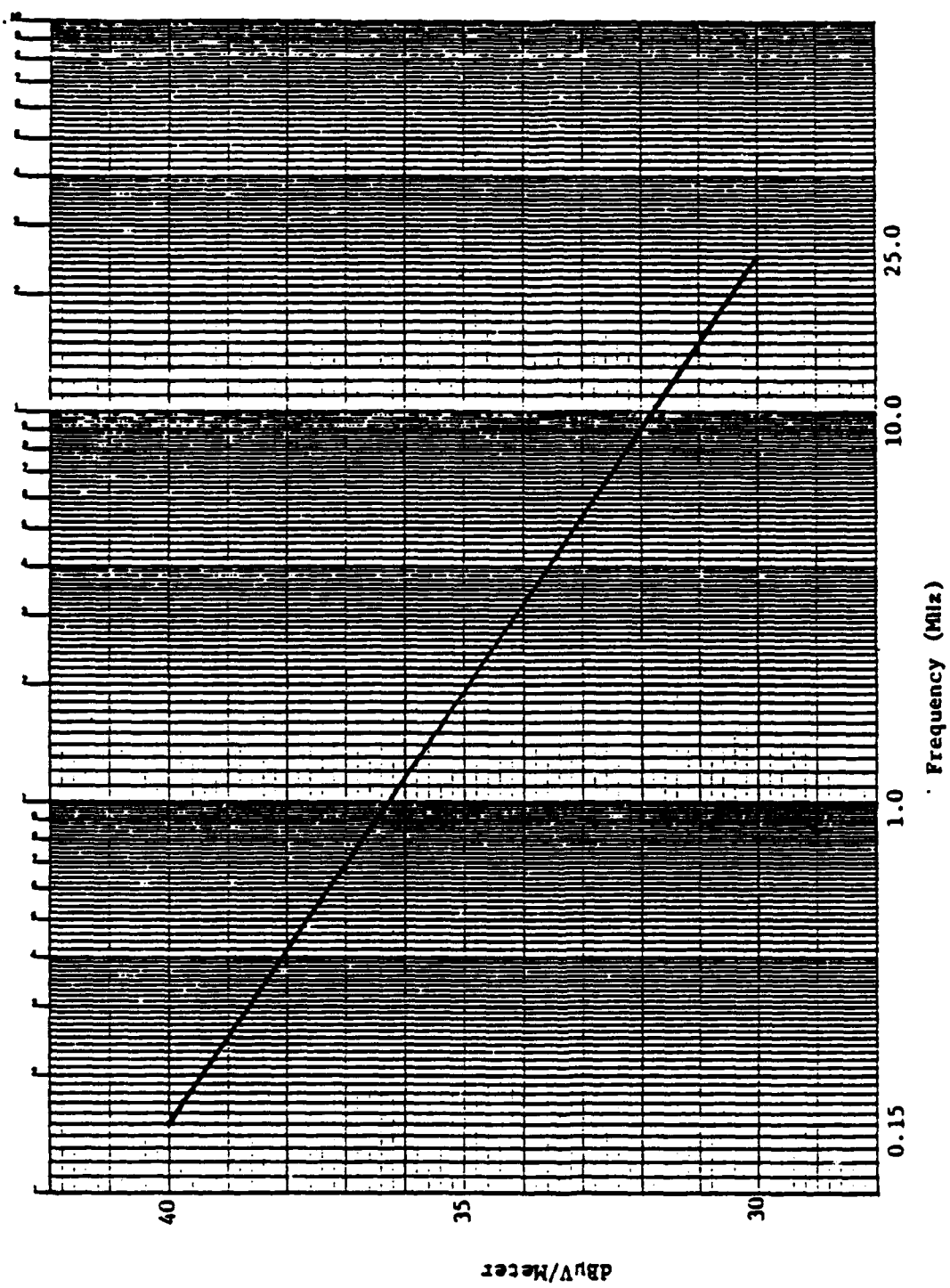


Figure 3. Reference Levels for Narrowband Emissions (REO2)

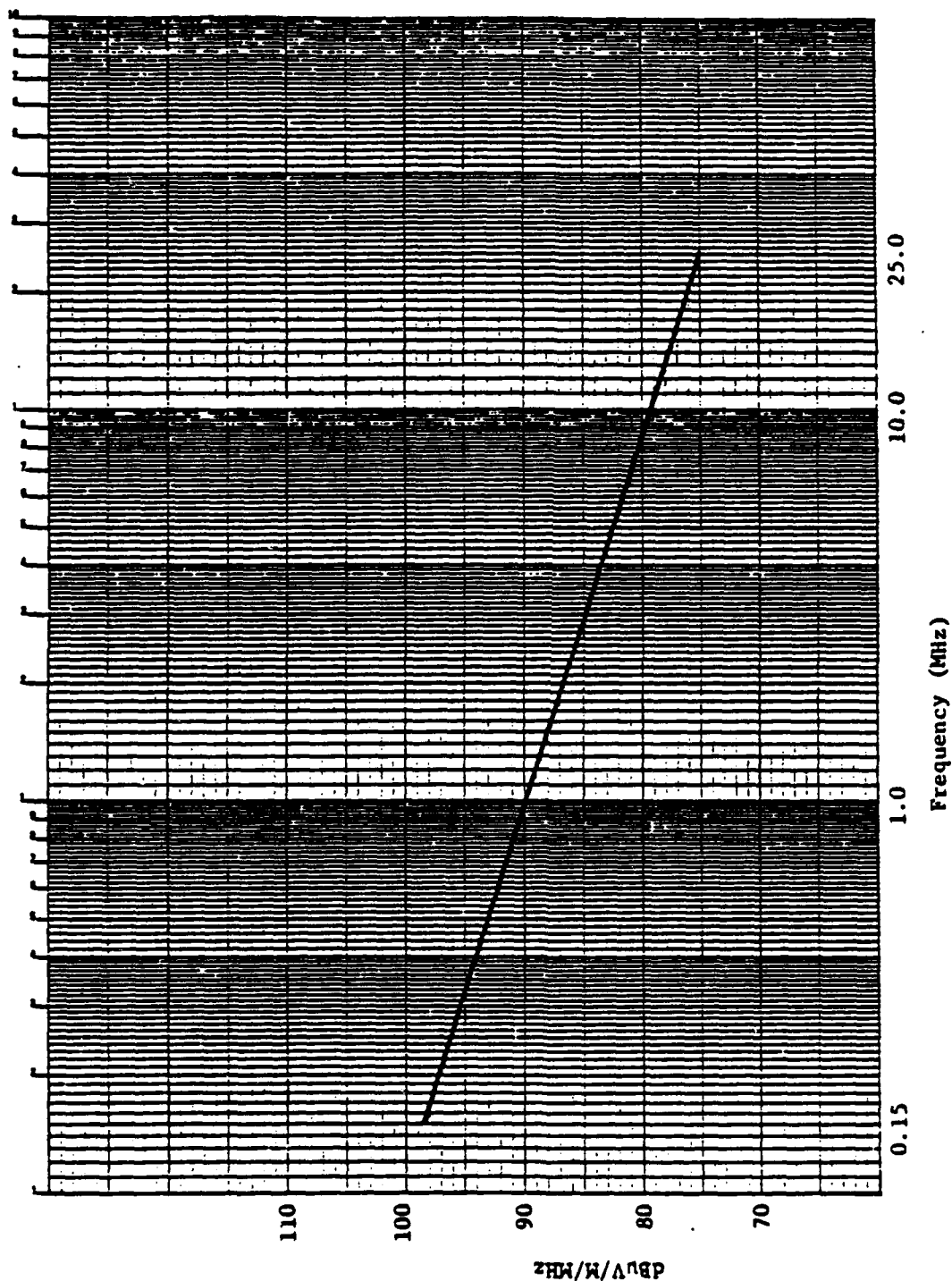


Figure 4. Reference Levels for Broadband Emissions (REO2)



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SIZE	CAGE CODE
<b>A</b>	<b>35351</b>
SCALE	NONE

DOCUMENT NO.  
ED1416

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17

## APPENDIX II

## Data Sheets

1. EMI Log Sheets. A master copy is included. Use this master to duplicate as many as required. Enter all annotation data, dates, and personnel.
2. EMC Functional Compatibility Test Matrix Sheet. A master copy is included.
3. Narrative Report. A master copy of a Narrative Report form is included for definition and solution of possible problems discovered during compatibility testing. Duplicate as many forms as needed. Report only one problem per form.



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SIZE

**A**

CAGE CODE

**35351**

SCALE

NONE

DOCUMENT NO.

ED1416

SHEET

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## ENVIRONMENTAL TEST LABORATORY

T. R. NO. \_\_\_\_\_  
Requested By \_\_\_\_\_  
Test Spec. \_\_\_\_\_  
Checked \_\_\_\_\_

# LOG SHEET

LOG NO. \_\_\_\_\_  
By: \_\_\_\_\_  
Date \_\_\_\_\_  
Test No. \_\_\_\_\_

- 1 -

TYPE of TEST: \_\_\_\_\_  
UNIT NOMENCLATURE: \_\_\_\_\_ SERNO \_\_\_\_\_  
EQUIPMENT USED: \_\_\_\_\_

**METHOD OF TEST:** \_\_\_\_\_

FREQ MHZ	CALIB	BW FACTOR	PROBE OR ANT FACTOR	ATTEN SETTING	METER READING	TOTAL READOUT	BB	NB
0.15								
25								

SIGNIFICANT RESULTS: \_\_\_\_\_



**SMITHS INDUSTRIES**  
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SIZE	CAGE CODE
<b>A</b>	<b>35351</b>
SCALE	NONE

DOCUMENT NO.  
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**SECRET**

[illegible]

Test Director \_\_\_\_\_  
Test Engineer \_\_\_\_\_

—



**LEAR SIEGLER, INC.**  
**INSTRUMENT DIVISION**

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SIZE	FSCM NO.	DOCUMENT NO.
A	35351	ED1309

**SHEET** 18



NARRATIVE REPORT

REV -

Functional Compatibility Test

Victim System:

Indication:

Interference Source:

Corrective Action Taken or Required

Date: \_\_\_\_\_  
Written By: \_\_\_\_\_  
Approved By: \_\_\_\_\_



LEAR SIEGLER, INC.  
INSTRUMENT DIVISION

4141 EASTERN AVENUE, S.E. GRAND RAPIDS, MI 49508

SIZE  
**A**

FSCM NO.  
**35351**

DOCUMENT NO.  
ED1309

SHEET  
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**APPENDIX 3**  
**EMC TEST PLAN DATA SHEETS**



4141 Eastern Ave. S.E. Grand Rapids, Mi 49518-9727

REV

ENVIRONMENTAL TEST LABORATORY

T. R. NO. 20829  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG SHEET

LOG NO. EU0436  
By: P. TUREK  
Date 2-3-88  
Test No. 6216-040

TYPE of TEST: CONDUCTED EMISSION POWER LEADS (SCNS) - C-130H - PRE-INSTALLATION  
UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C SERNO \_\_\_\_\_  
EQUIPMENT USED: IFR 7550 SPECTRUM ANALYZER S/N 1185  
CP105 I PROBE

METHOD of TEST: \_\_\_\_\_

PARA 4.1.4.1

POWER LINE IDENT.	POWER LINE	PHOTO 0-1 MHZ	PHOTO 1-10MHZ	PHOTO 10-30MHZ		
DC ESSENTIAL BUS	A	A-1	A-2	A-3		
26v AC 400HZ ANTISKID	B	B-1	B-2	B-3		
115v AC 400HZ ØA ESS.	C	C-1	C-2	C-3		
115v AC 400HZ ØB ESS.	D	D-1	D-2	D-3		
115v AC 400HZ ØC ESS.	E	E-1	E-2	E-3		
115v AC 400HZ ØA MAIN	F	F-1	F-2	F-3		
115v AC 400HZ ØB MAIN	G	G-1	G-2	G-3		
115v AC 400HZ ØC MAIN	H	H-1	H-2	H-3		
115v AC 400HZ ØA RT. HD	I	I-1	I-2	I-3		
115v AC 400HZ ØB RT. HD	J	J-1	J-2	J-3		
115v AC 400HZ ØC RT. HD	K	K-1	K-2	K-3		
115v AC 400HZ ØA LFT. HD	L	L-1	L-2	L-3		
115v AC 400HZ ØB LFT. HD	M	M-1	M-2	M-3		
115v AC 400HZ ØC LFT. HD	N	N-1	N-2	N-3		
28v DC LITE	O	O-1	O-2	O-3		

SIGNIFICANT RESULTS: \_\_\_\_\_



SMITHS INDUSTRIES  
SLI AVIONIC SYSTEMS CORP.

4141 Eastern Ave. S.E., Grand Rapids, MI 49518-8727

SIZE

A

CAGE CODE

35351

DOCUMENT NO.

SHEET

**REV**

**ENVIRONMENTAL TEST LABORATORY**

T. R. NO. 20829  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

**LOG SHEET**

LOG NO. E40437  
By: P. TUREK  
Date 2-3-88  
Test No. 6216-040

TYPE of TEST: RADIATED EMISSIONS (SCNS) - C-130H  
UNIT NOMENCLATURE: SLI MODELS 6216A 6216B 6216C SERNO \_\_\_\_\_  
EQUIPMENT USED: IFR 7550 SPECTRUM ANALYZER S/N 1185

METHOD of TEST: \_\_\_\_\_

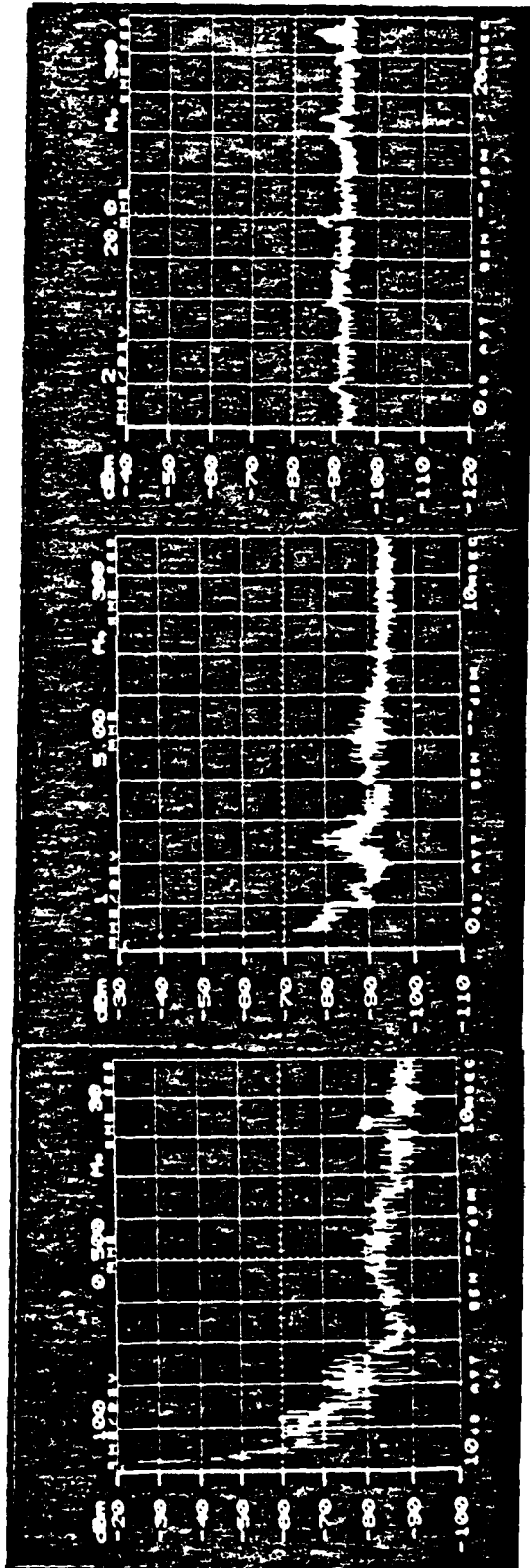
ANT. LOCATIONS	LOCATION	PHOTO 0-1MHZ	PHOTO 1-10MHZ	PHOTO 10-30MHZ	ANT. LENGTH	GND STRAP LENGTH
PILOTS STATION	P	P-1	P-2	P-3	41"	14"
PILOTS STATION AMBIENT	Q	Q-1	Q-2	Q-3	41"	14"
CO-PILOTS STATION	R	R-1	R-2	R-3	41"	14"
NAV. STATION	S	S-1	S-2	S-3	41"	28"
RT. HD. U DECK OUTBD	T	T-1	T-2	T-3	28"	14"
RT. HD. U DECK INBD	U	U-1	U-2	U-3	6-3/4"	19"
LFT. HD. U DECK INBD	V	V-1	V-2	V-3	6-3/4"	19"
LFT. HD. U DECK OUTBD	W	W-1	W-2	W-3	41"	19"
LFT. HD. U DECK OUTBD AMB.	X	X-1	X-2	X-3	41"	19"
* SPECIAL VHF CULPRIT	W-3					
** INU OFF-BUS PWR ONLY	W-3					

SIGNIFICANT RESULTS: \_\_\_\_\_

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. E40436  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

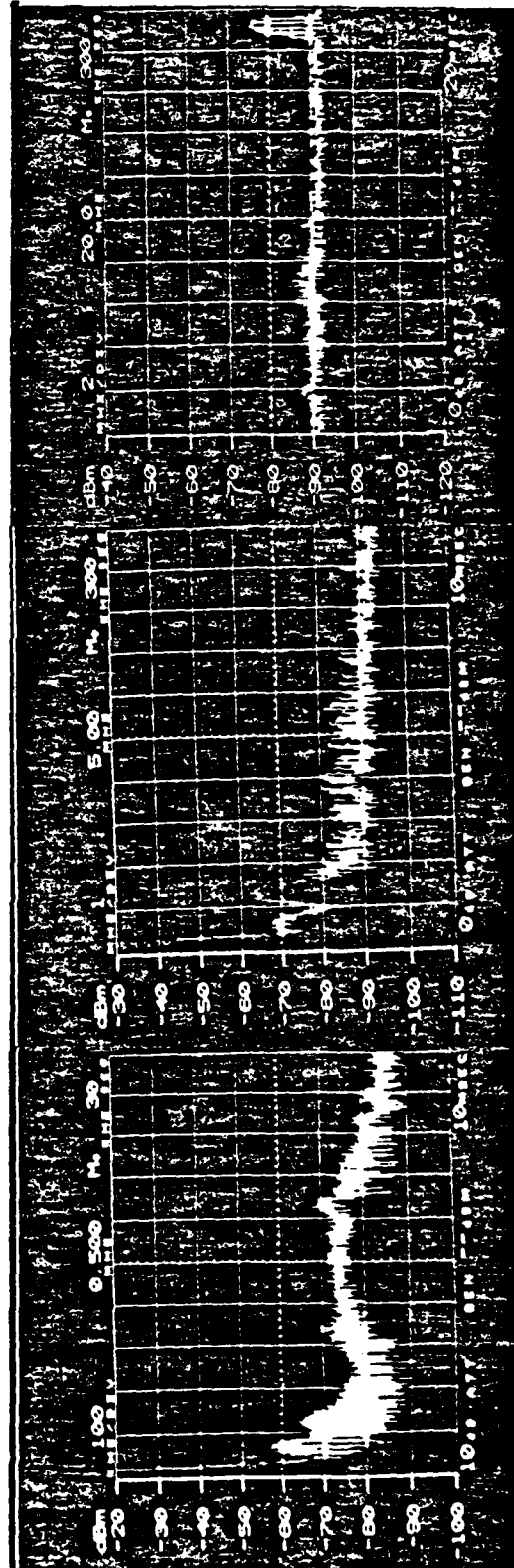
LOG NO. E40438  
By P. TUREK  
Date 2-3-88  
Test No. 6216-040



A-3

A-2

A-1



B-3

B-2

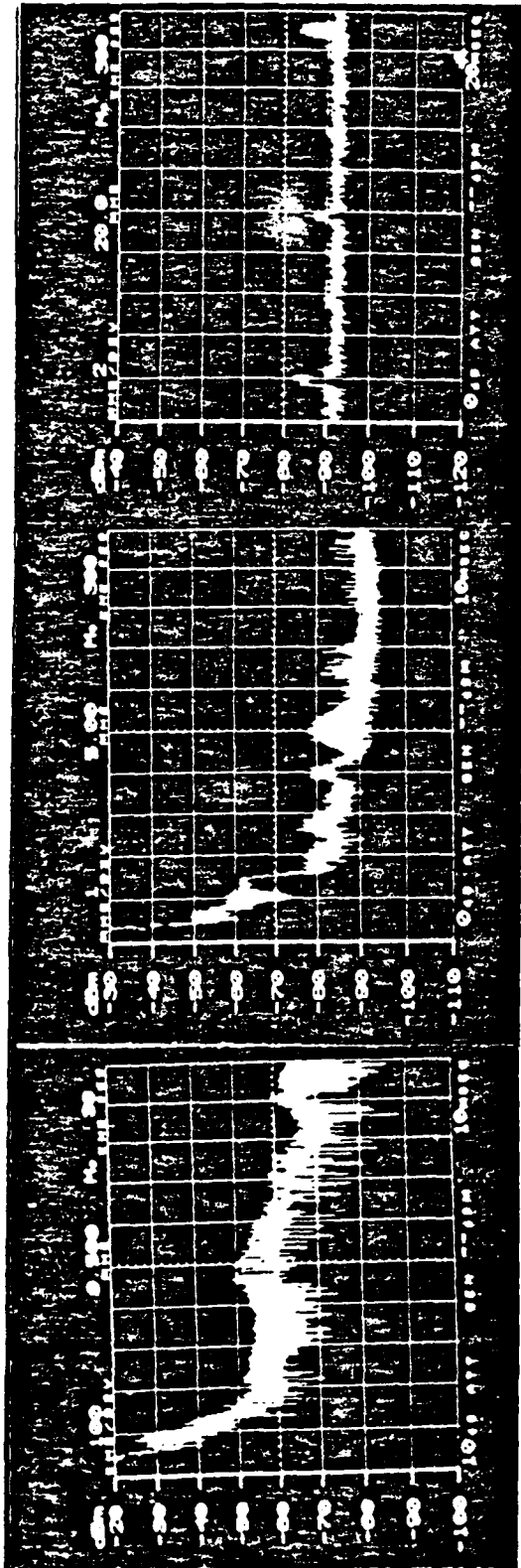
B-1

PRE-INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JANES  
Test Spec. ED 1309  
Checked                     

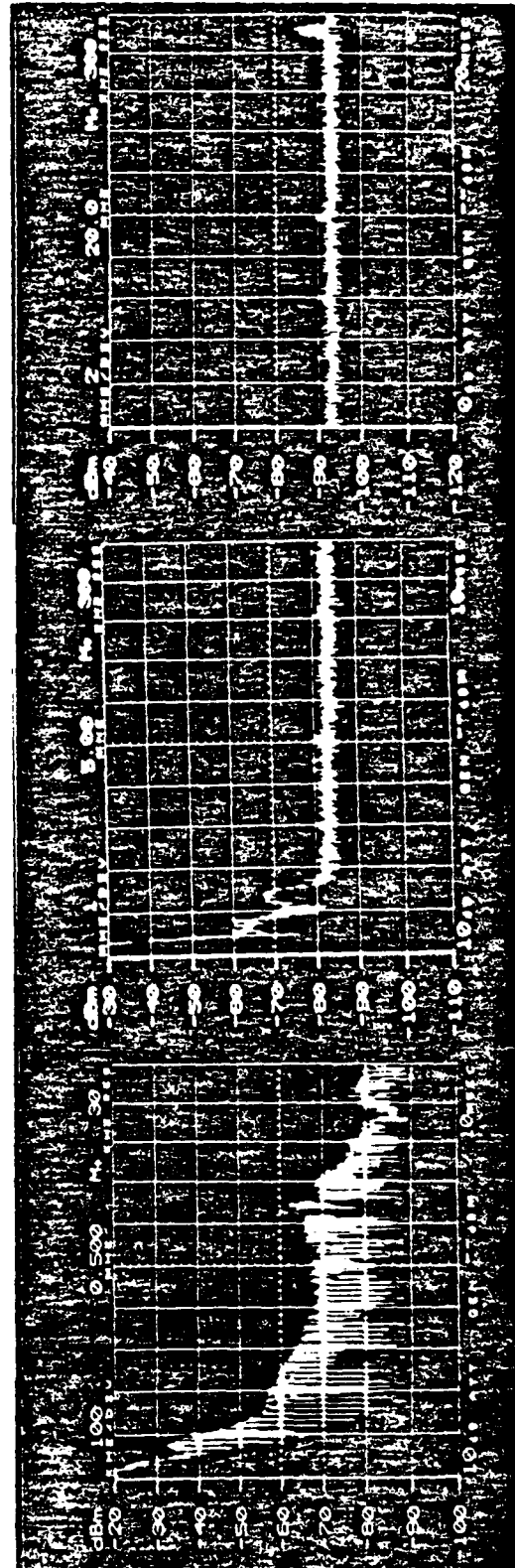
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By P. TUREK  
Date 2-3-88  
Test No. 6216-040



C-3

C-2

C-1



D-3

D-2

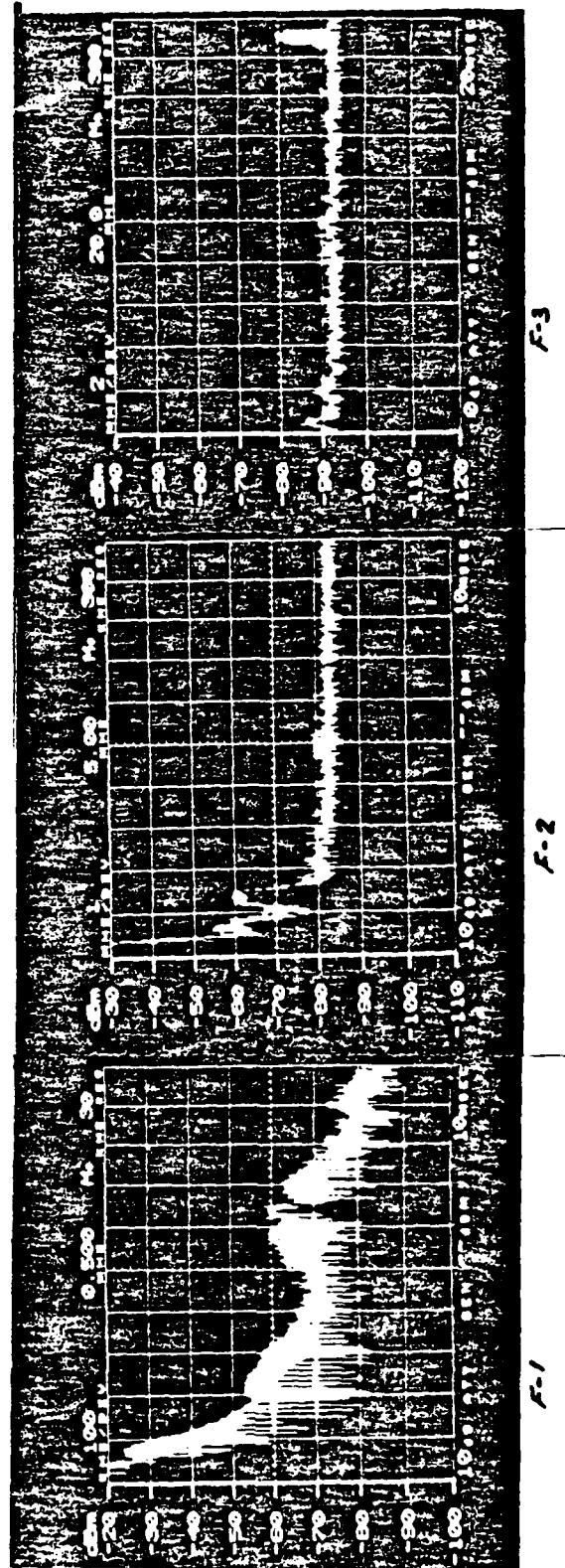
D-1

PRE-INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JANES  
Test Spec. ED 1309  
Checked         

LOG NO. EU0440  
By P. TUREK  
Date 2-3-88  
Test No. 6216-040

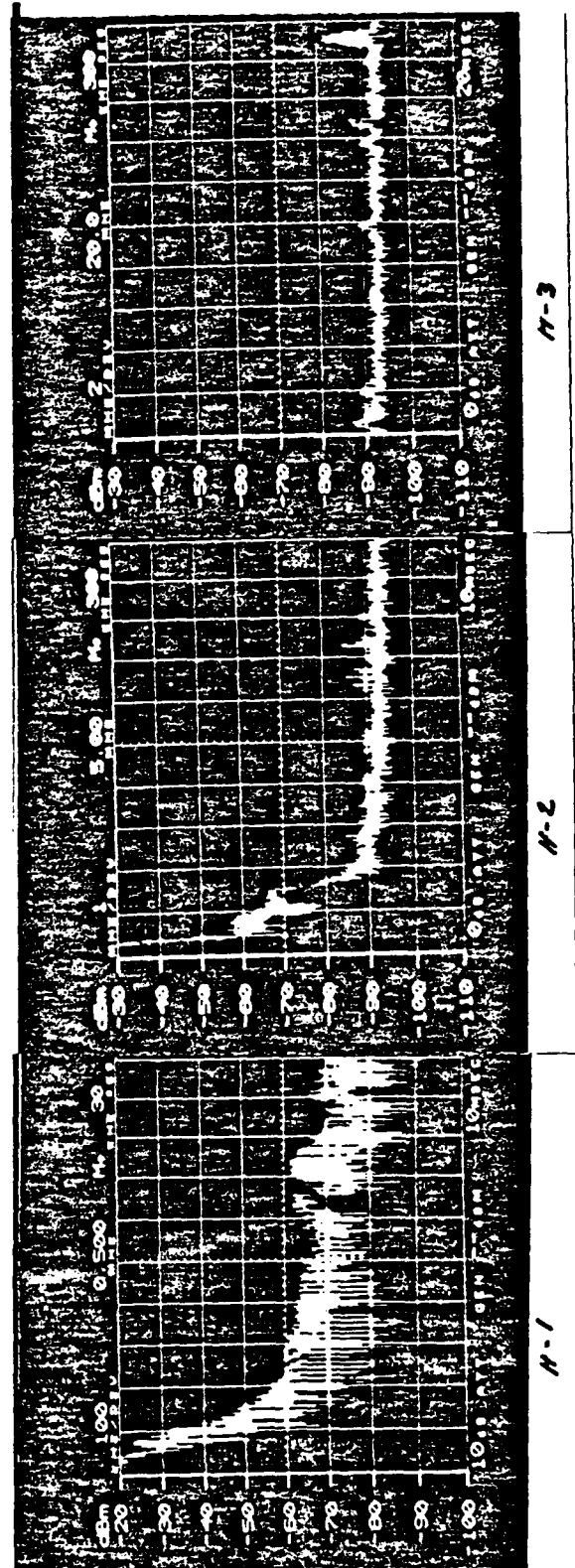
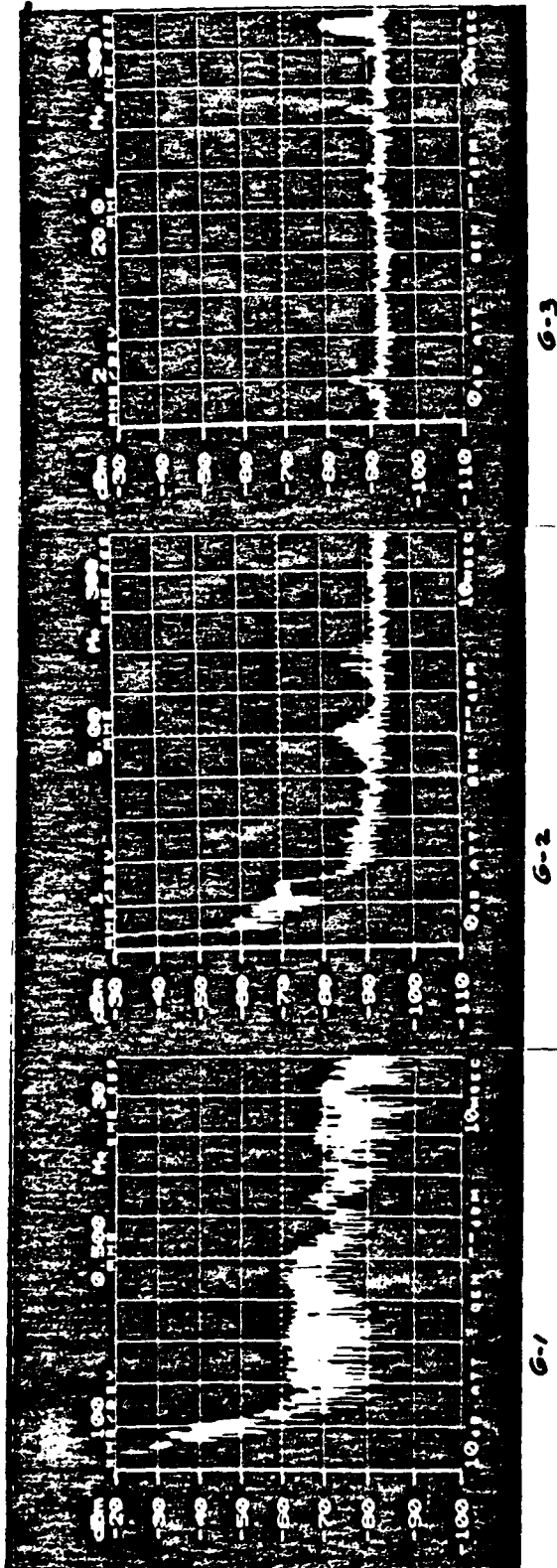


PRE-INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU0441  
By P. TUREK  
Date 2-3-88  
Test No. 6216-040



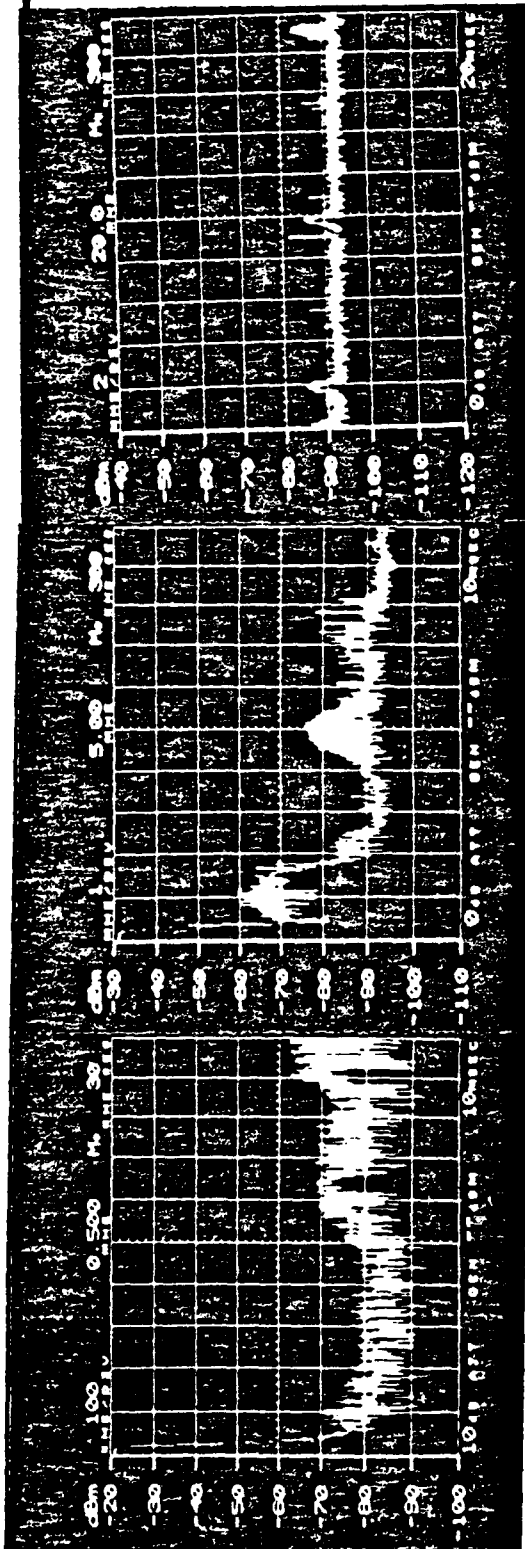
PRE-INSTALLATION



ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

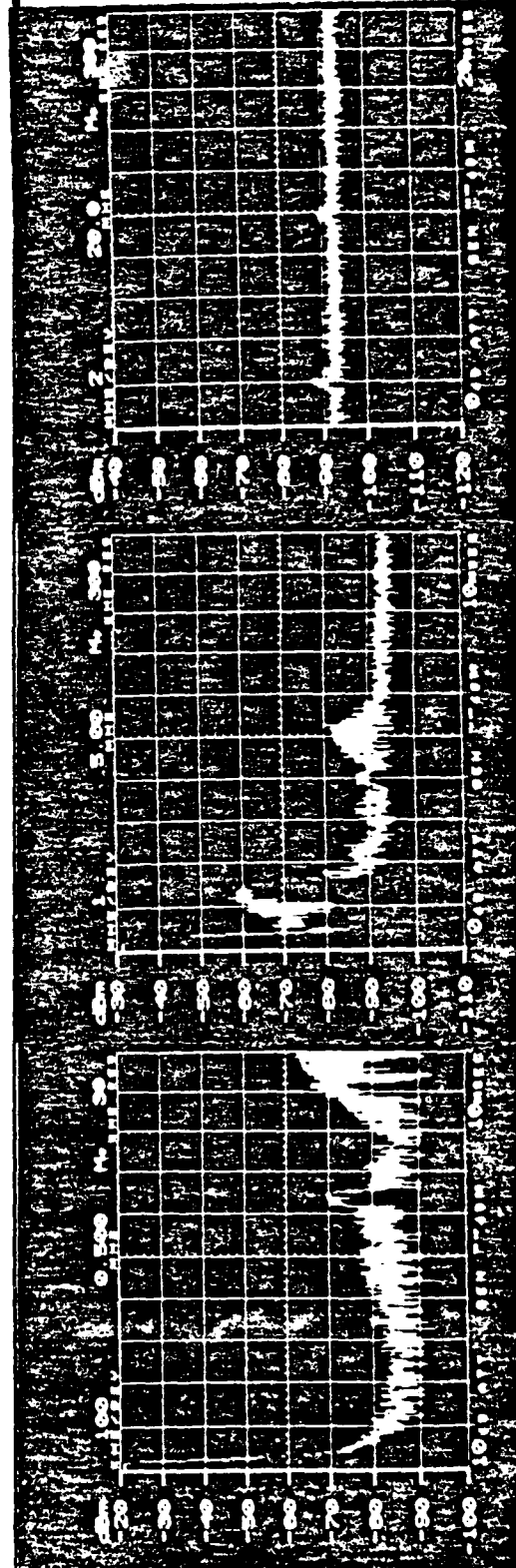
LOG NO. EU 0442  
By P. TUREK  
Date 2-3-88  
Test No. 6216-040



I-3

I-2

I-1



J-3

J-2

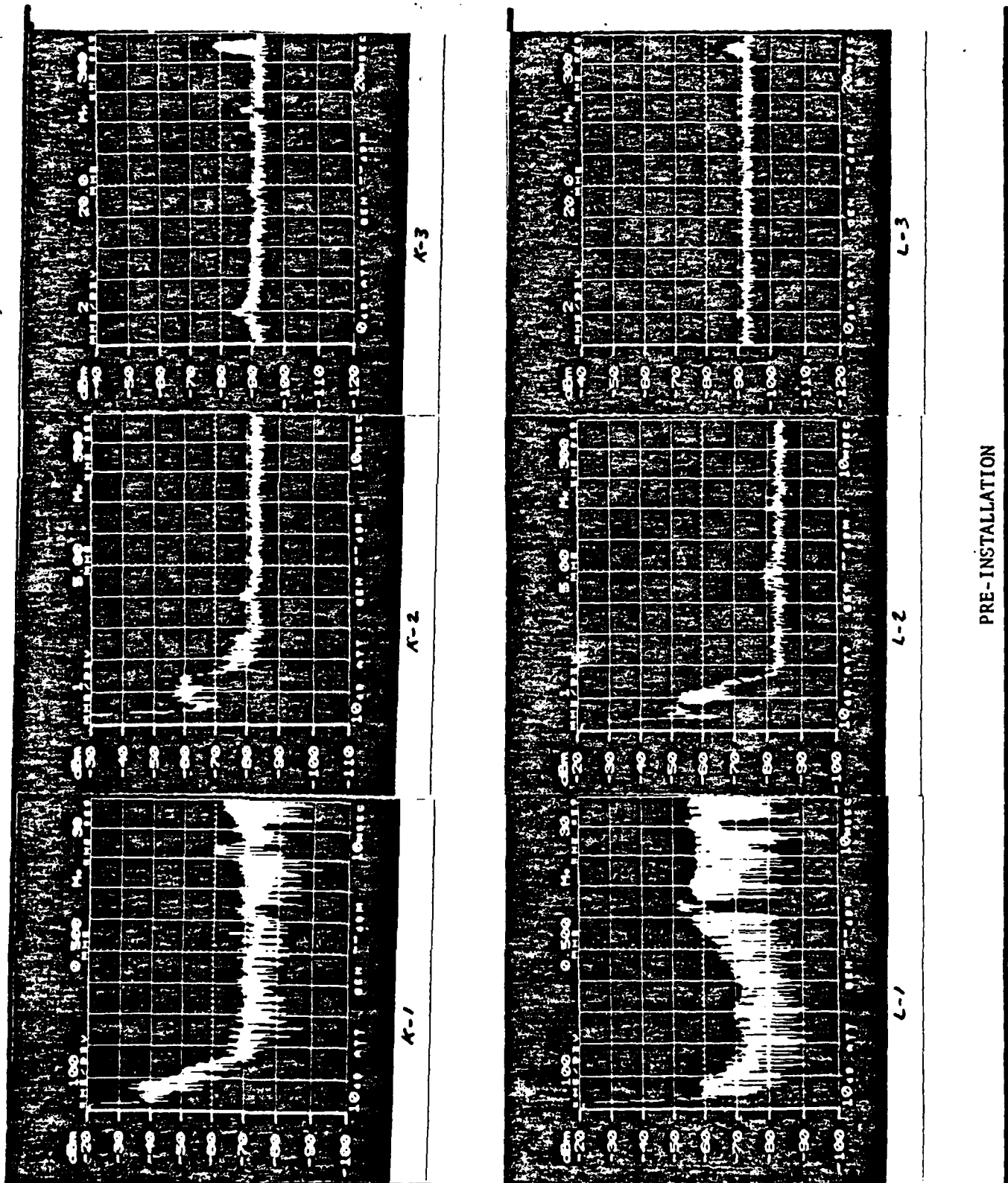
J-1

PRE-INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JANES  
Test Spec. ED 1309  
Checked     

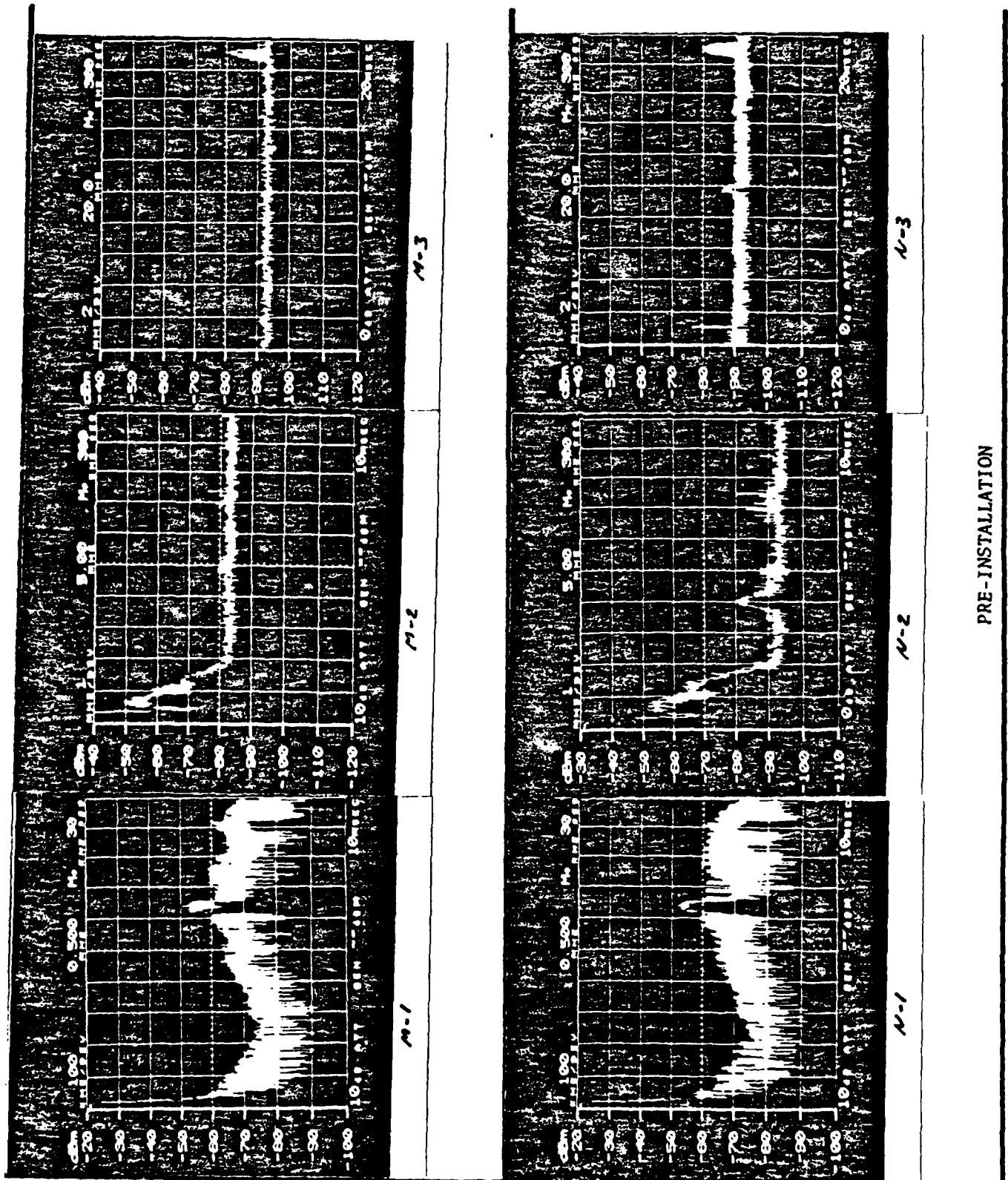
LOG NO. EU0443  
By P. TUREK  
Date 2-3-88  
Test No. 6216-040



ENVIRONMENTAL TEST LABORATORY

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Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

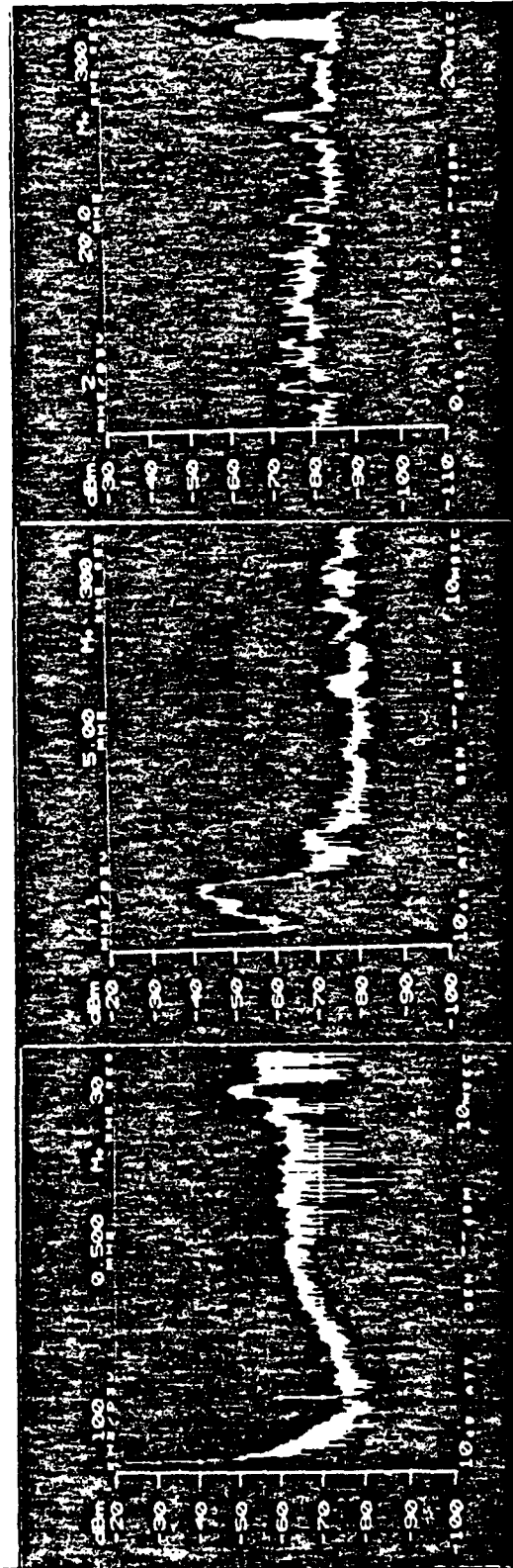
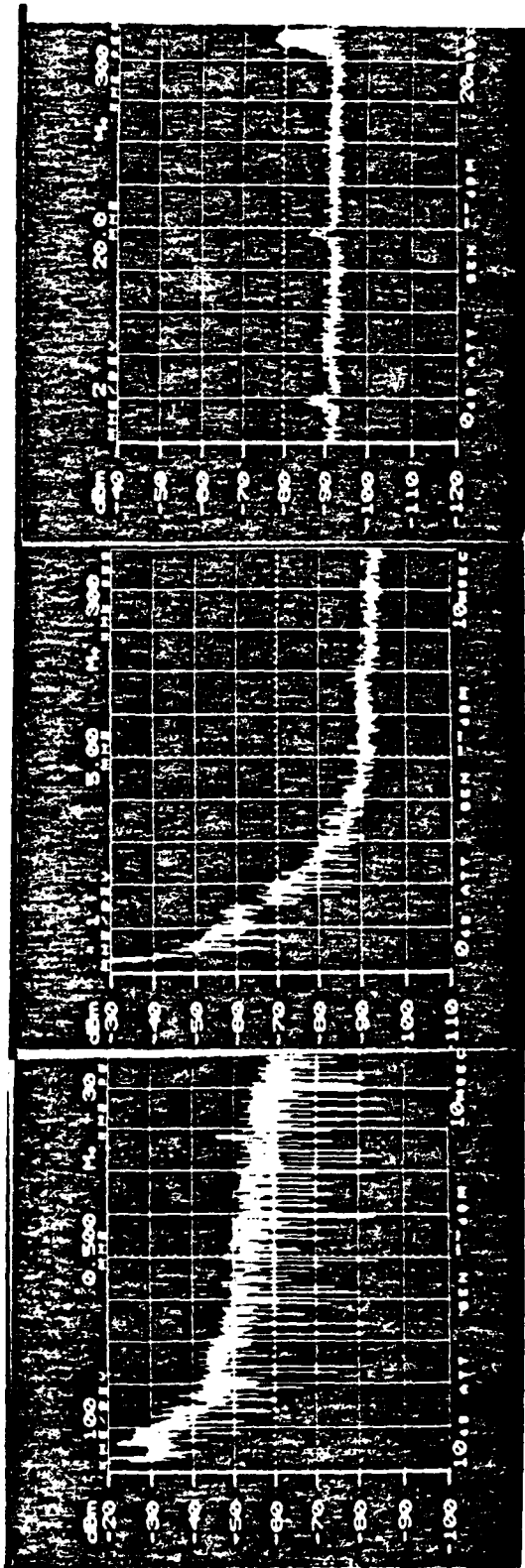
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By P. TUREK  
Date 2-3-88  
Test No. 6216-040



ENVIRONMENTAL TEST LABORATORY

REF LOG NO. E40436  
E40437  
 Requested By M. JAMES  
 Test Spec. ED 1309  
 Checked                     

LOG NO. E40445  
 By P. TUREK  
 Date 2-3-88  
 Test No. 6216-040

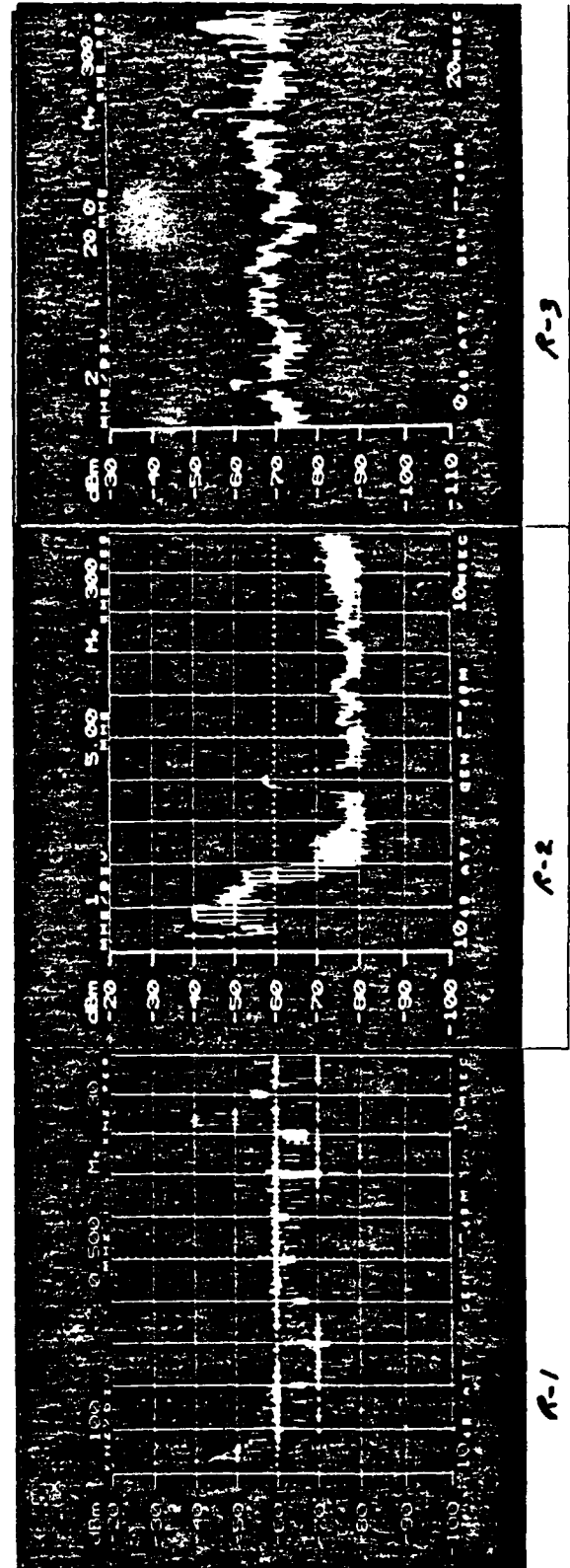
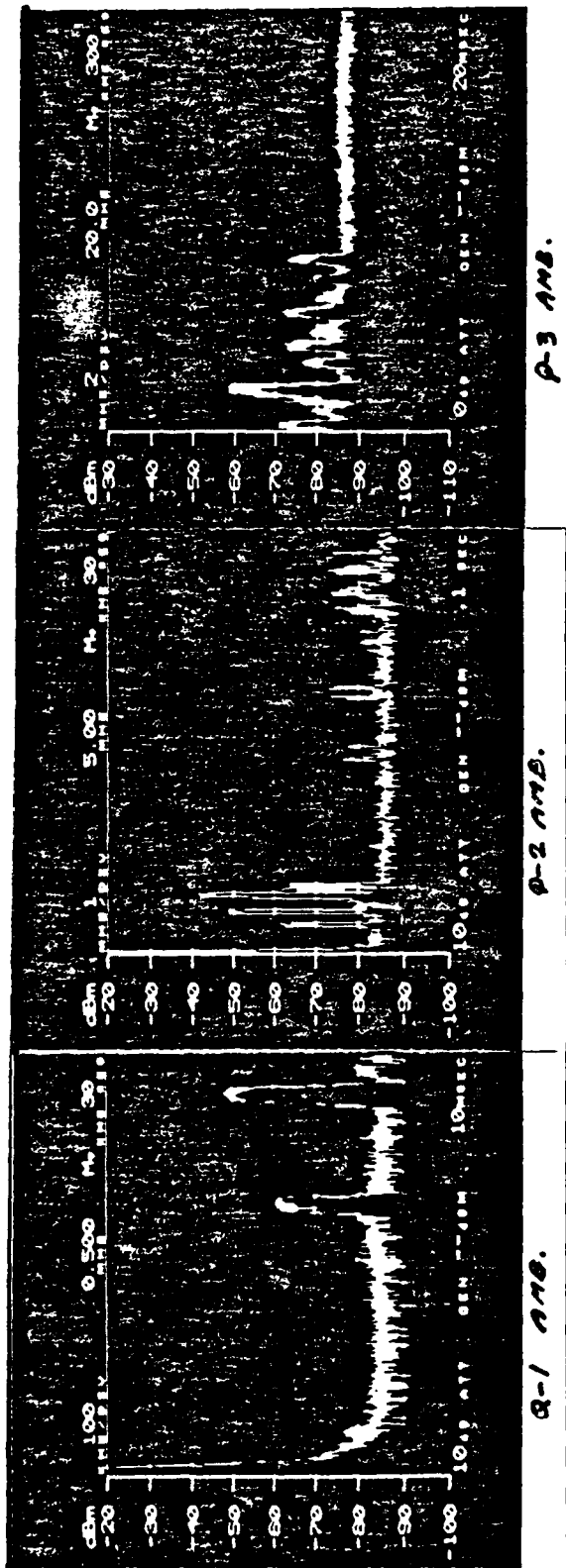


PRE-INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0437  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU 0446  
By P. TUREK  
Date 2-3-88  
Test No. 6216-04D

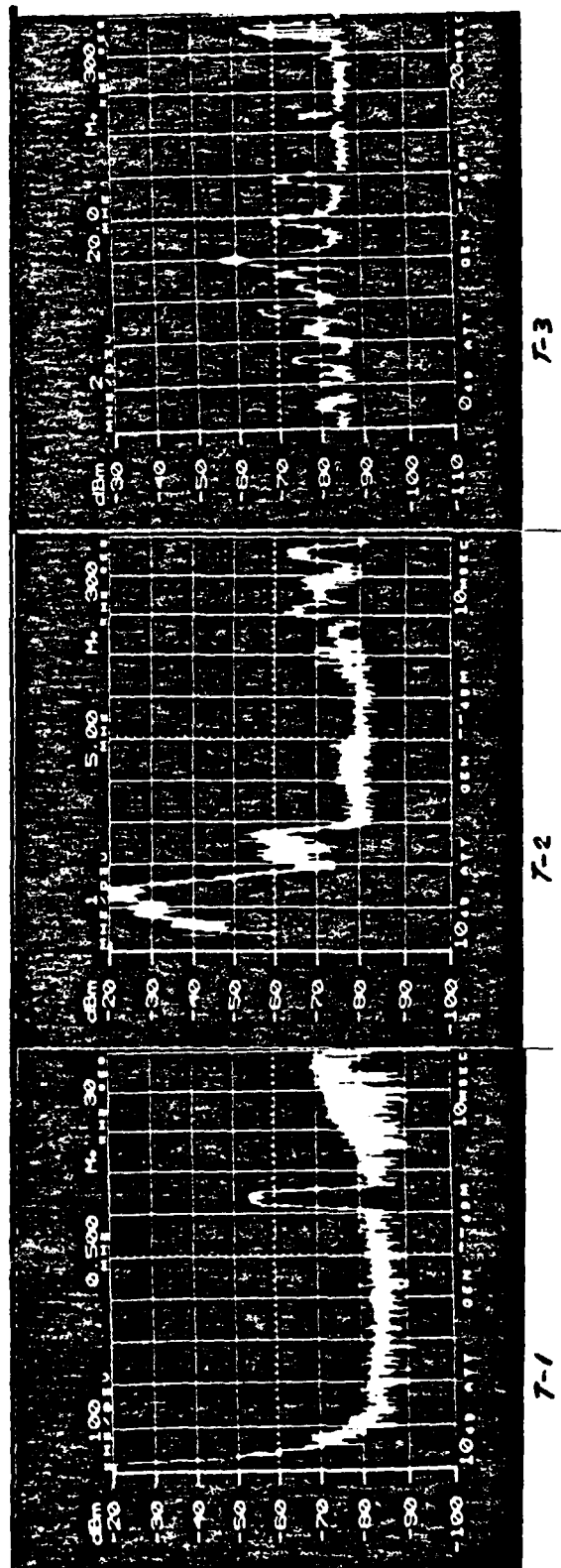
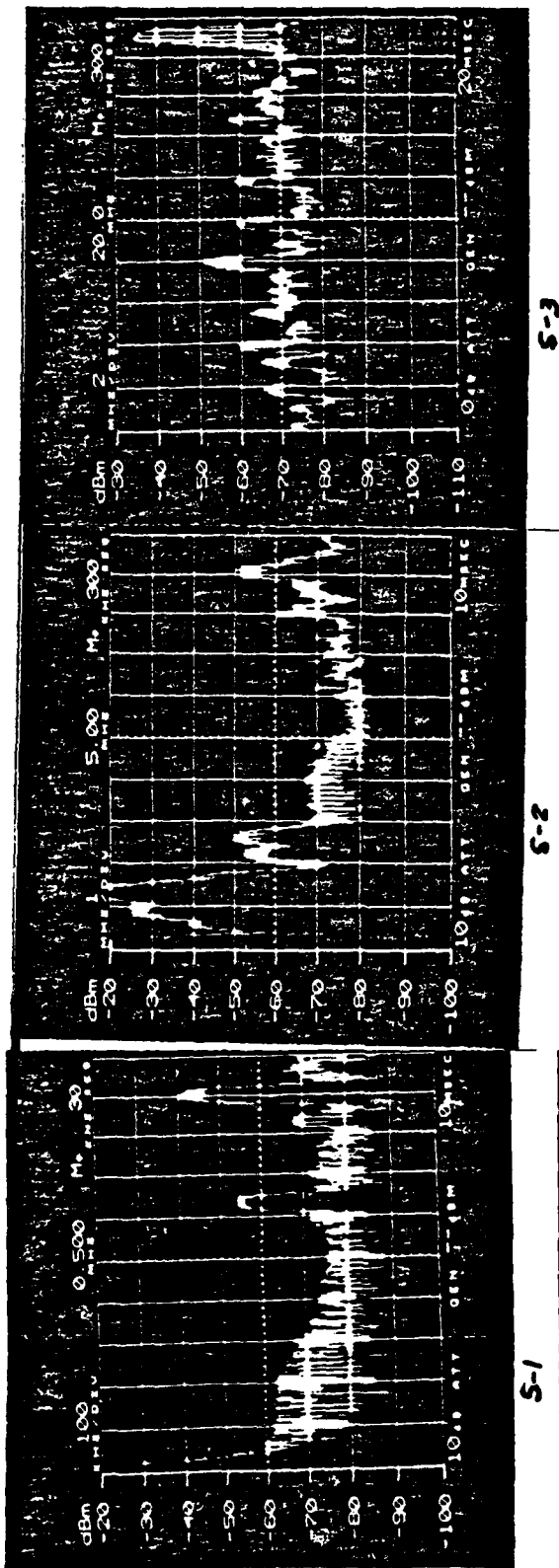


PRE-INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0437  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

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By P. TUREK  
Date 2-3-88  
Test No. 6216-040

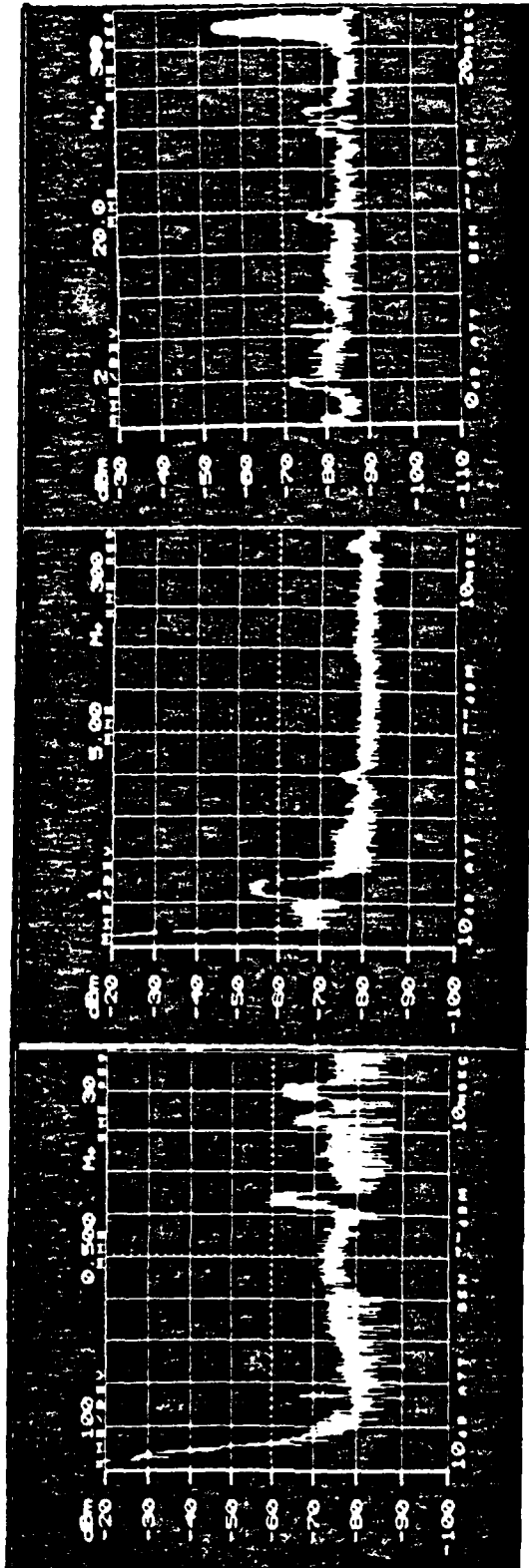


PRE-INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU 0437  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

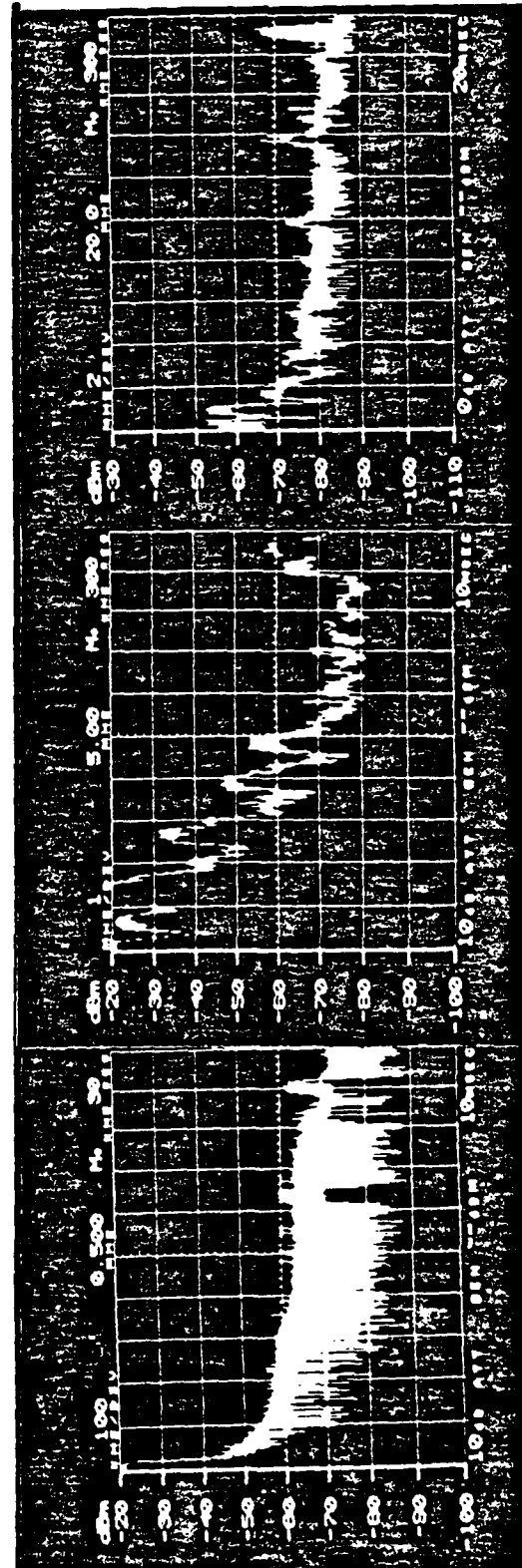
LOG NO. EU 0446  
By P. TUREK  
Date 2-3-88  
Test No. 6216-040



U-3

U-2

U-1



V-3

V-2

V-1

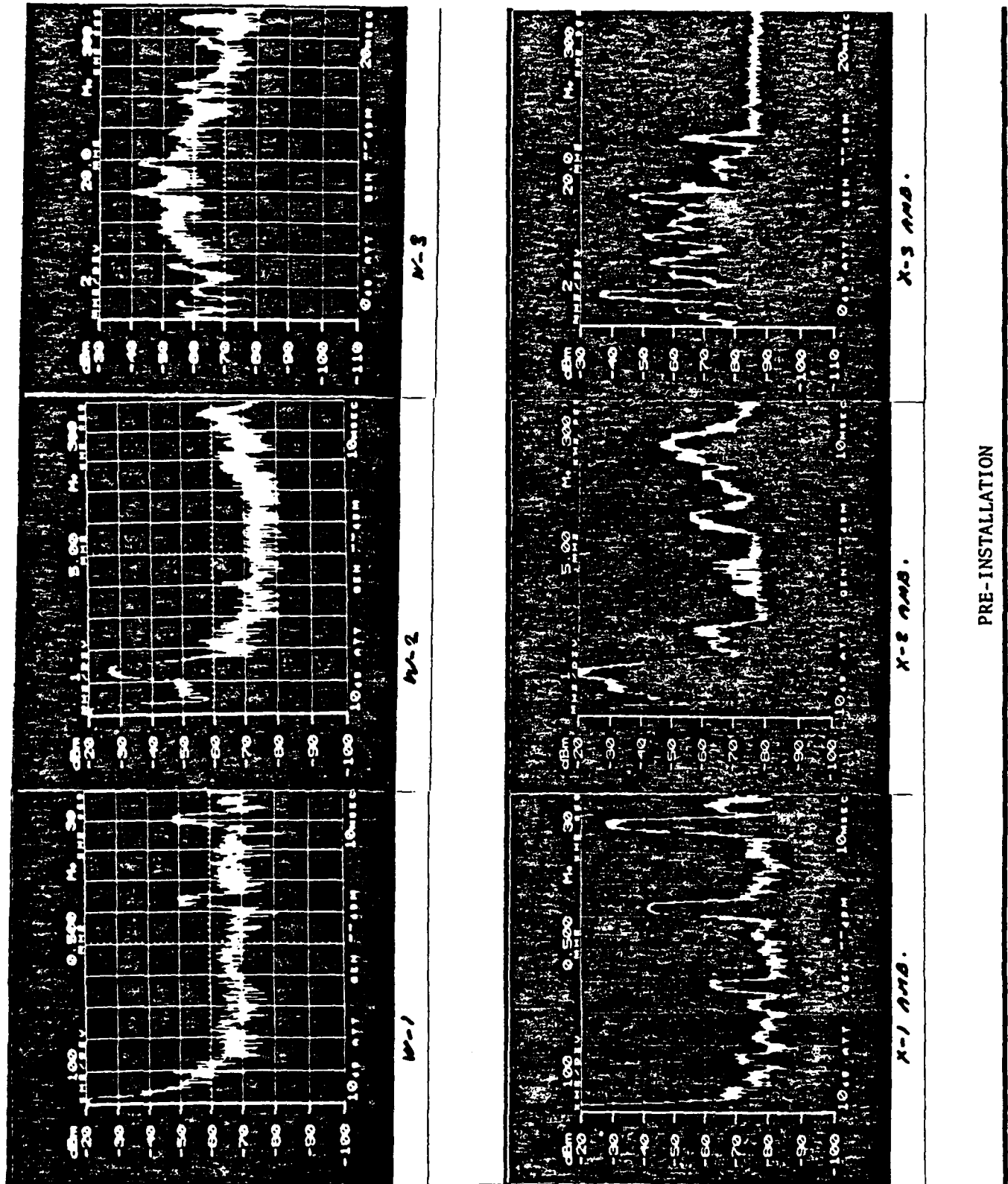
PRE-INSTALLATION



ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU 0437  
 Requested By M. JANES  
 Test Spec. ED 1309  
 Checked                     

LOG NO. EU 0449  
 By P. TUREK  
 Date 2-3-88  
 Test No. 6216-040

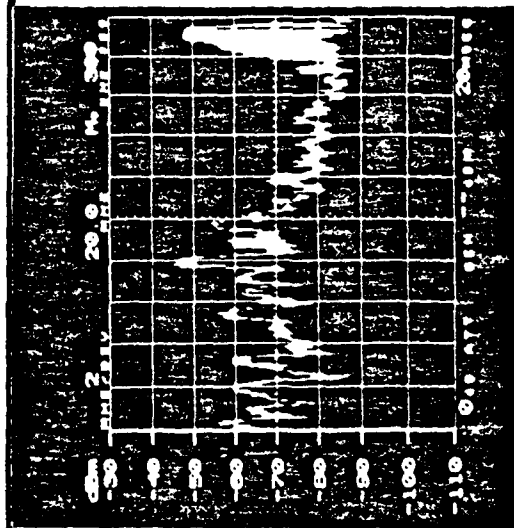
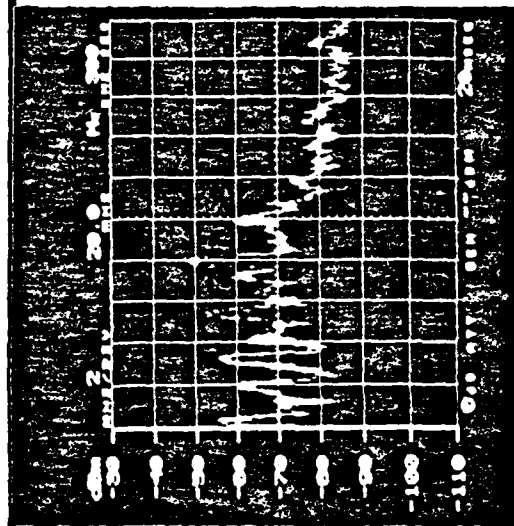




## ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0437  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU 0450  
By P. TUREK  
Date 2-3-88  
Test No. 6216-040



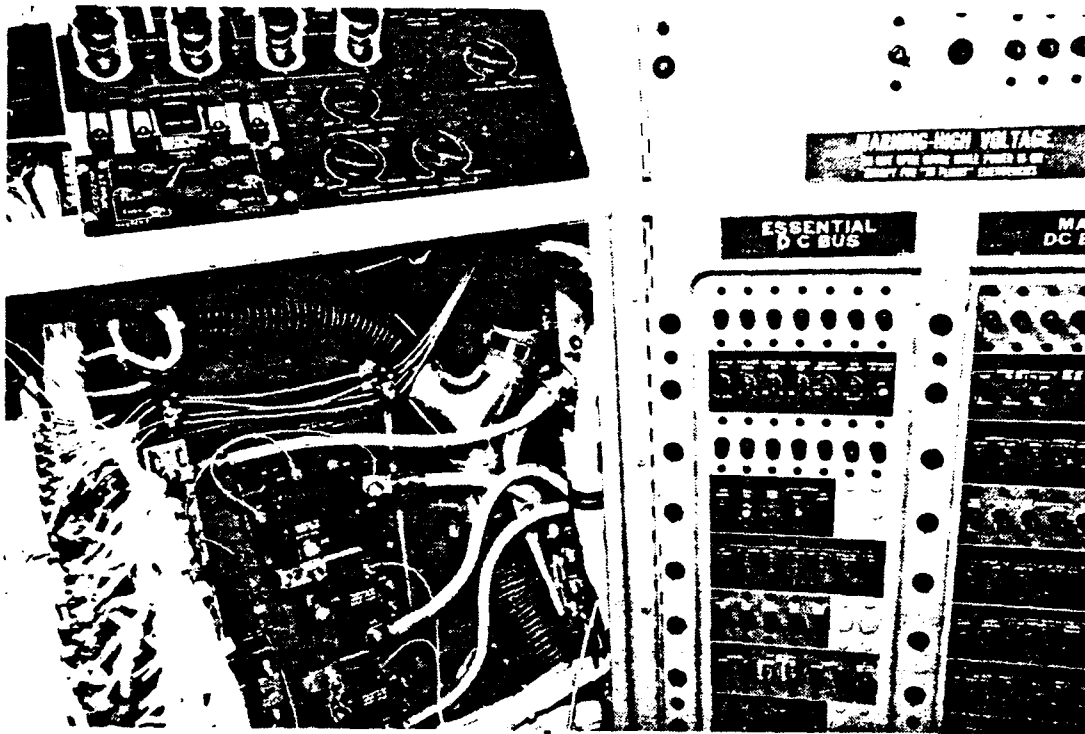
PRE-INSTALLATION

ALL RADARS &amp; RADIO OFF

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked     

LOG NO. EU0451  
By P. TURER  
Date 1-20-88  
Test No. 6216-040



DC ESSENTIAL BUS

A



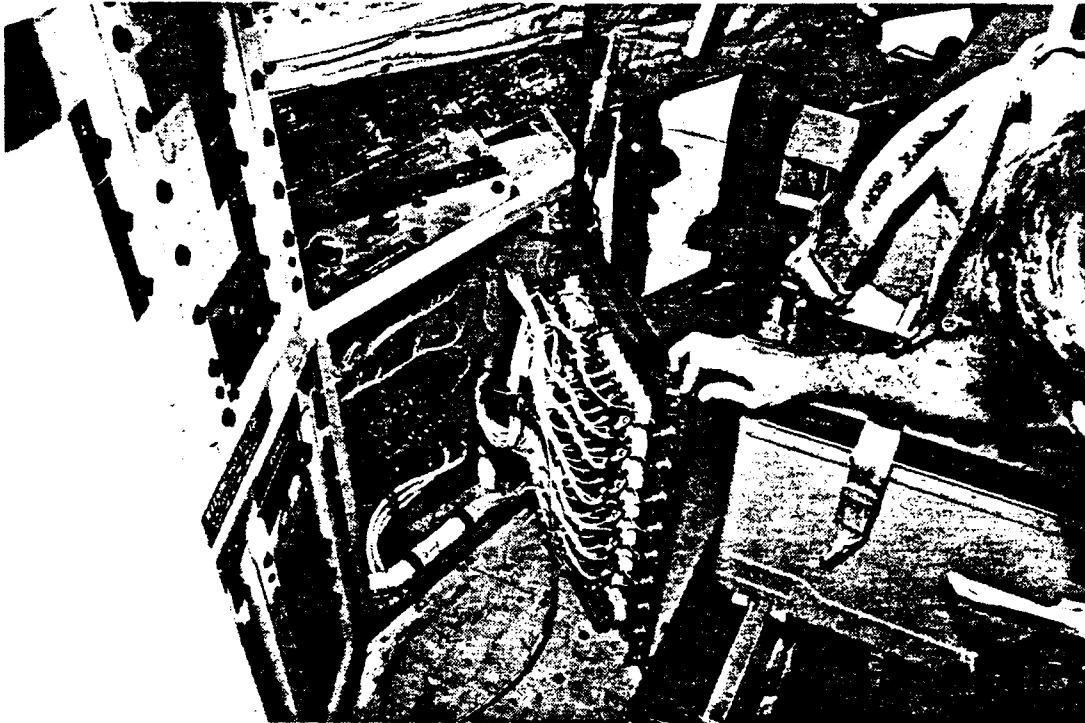
26v AC 400HZ ANTISKID

B

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EUC436  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU 0452  
By P. TUREK  
Date 1-20-88  
Test No. 6216-040



115v AC 400HZ ØA ESS.

C



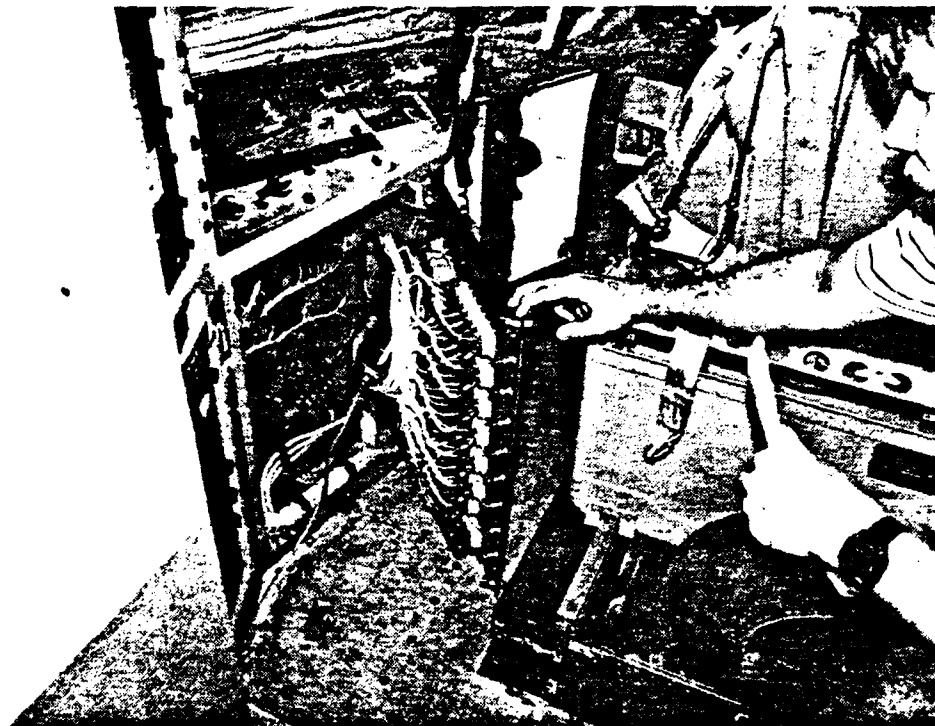
115v AC 400HZ ØB ESS.

D

ENVIRONMENTAL TEST LABORATORY

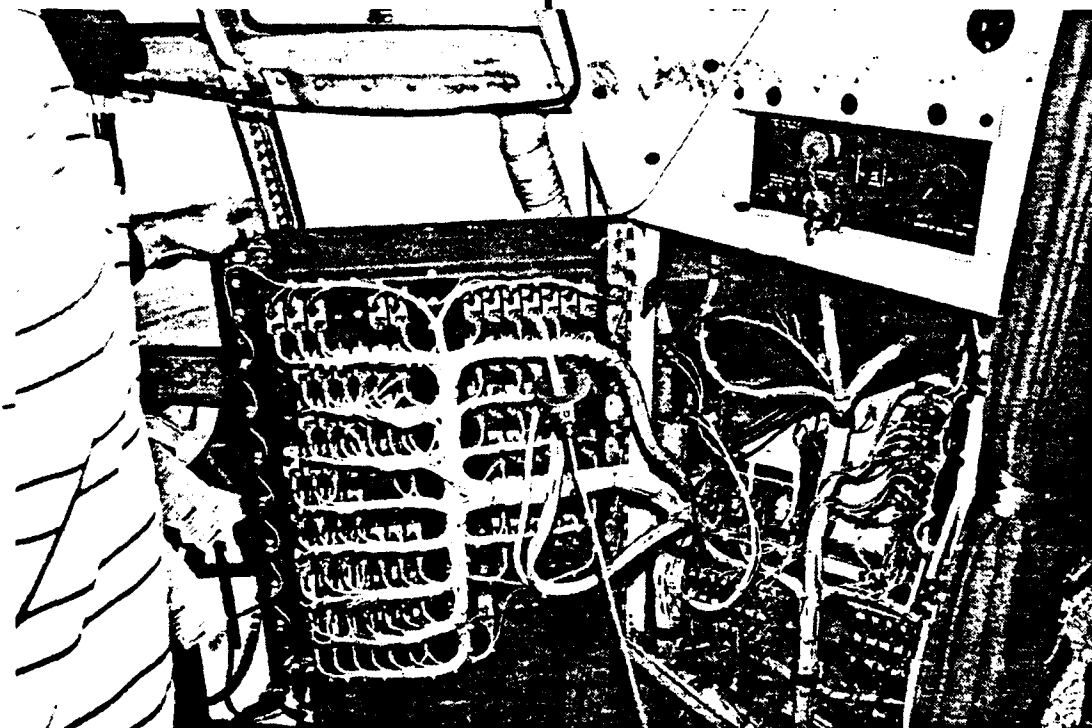
REF LOG NO. EU0436  
Requested By M. JAHES  
Test Spec. ED 1309  
Checked     

LOG NO. EU0453  
By P. TUREK  
Date 1-20-88  
Test No. 6216-040



115v AC 400HZ DC ESS.

E



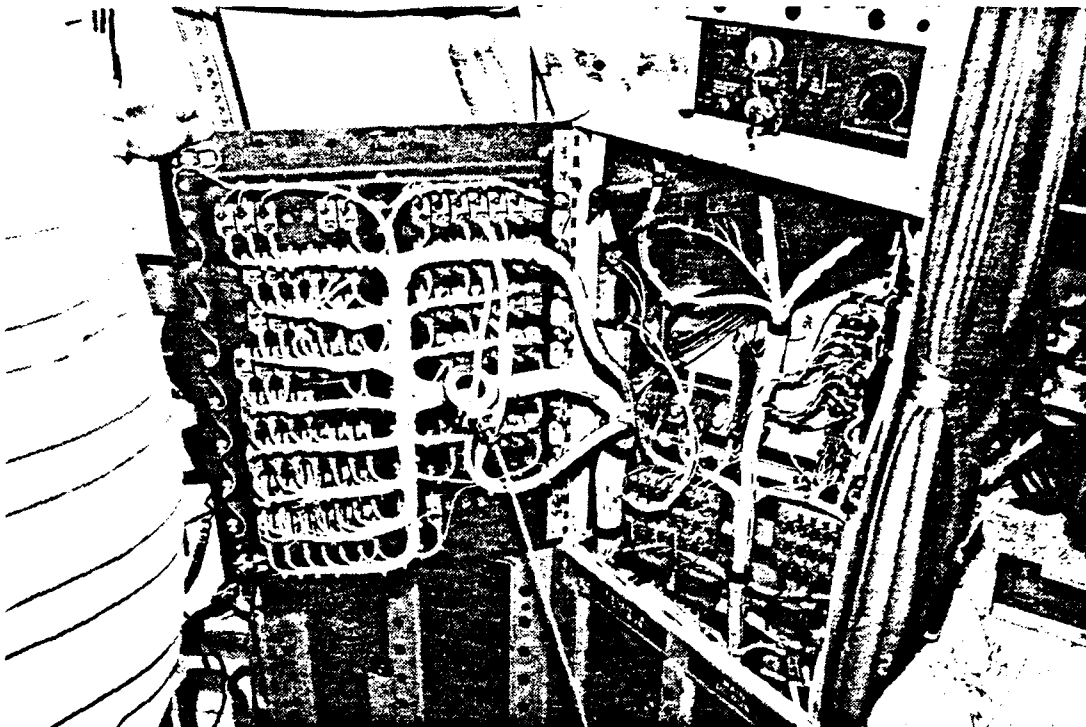
115v AC 400HZ DA MAIN

F

ENVIRONMENTAL TEST LABORATORY

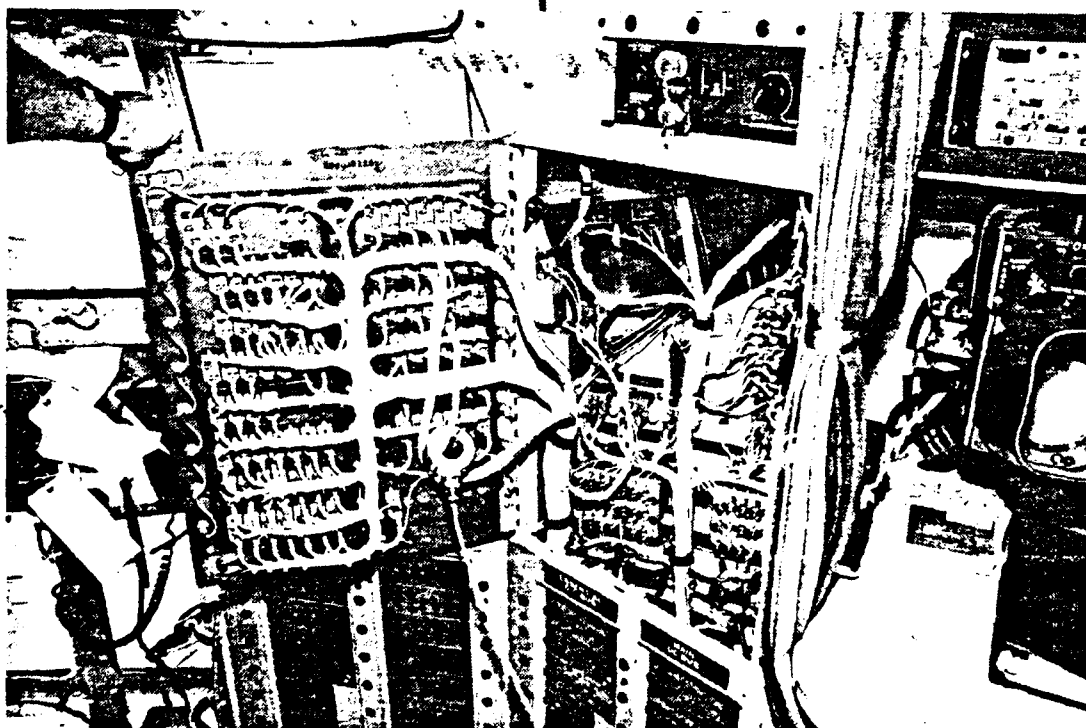
REF LOG NO. EU0436  
Requested By M. JAMES  
Test Spec. ED 13C9  
Checked     

LOG NO. EU0454  
By P. TUREK  
Date 1-20-88  
Test No. 6216-040



115v AC 400HZ 0B MAIN

G



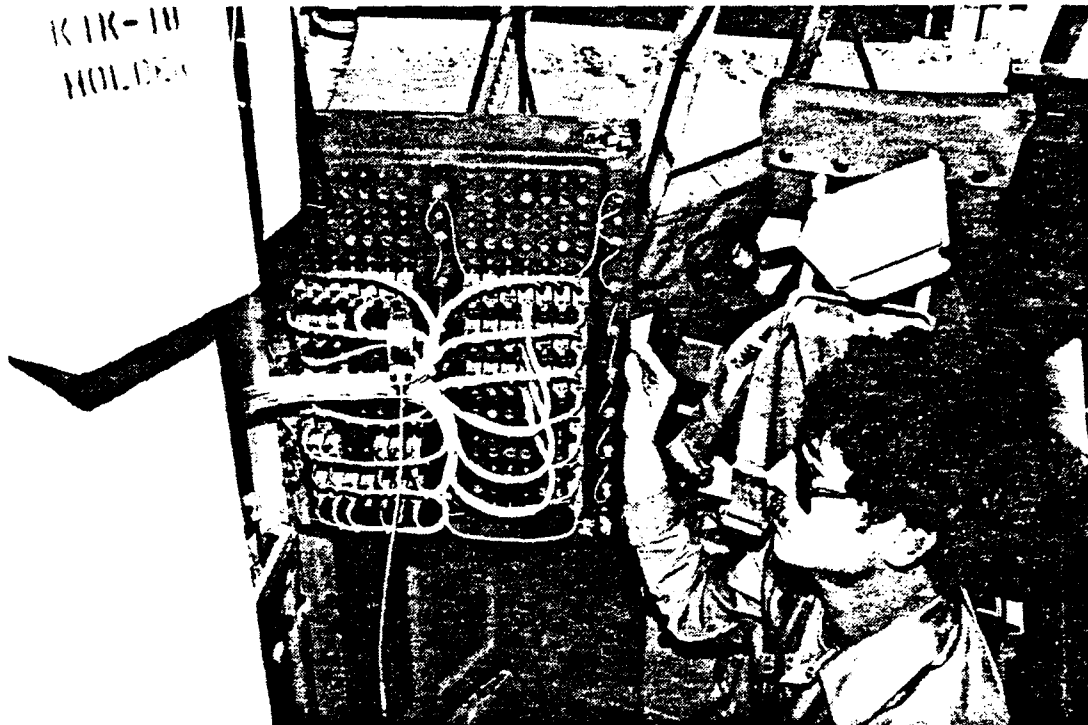
115v AC 400HZ 0C MAIN

H

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked     

LOG NO. EU0455  
By P. TUREK  
Date 1-20-88  
Test No. 6216-040



115v AC 400HZ 0A RT. HD

I



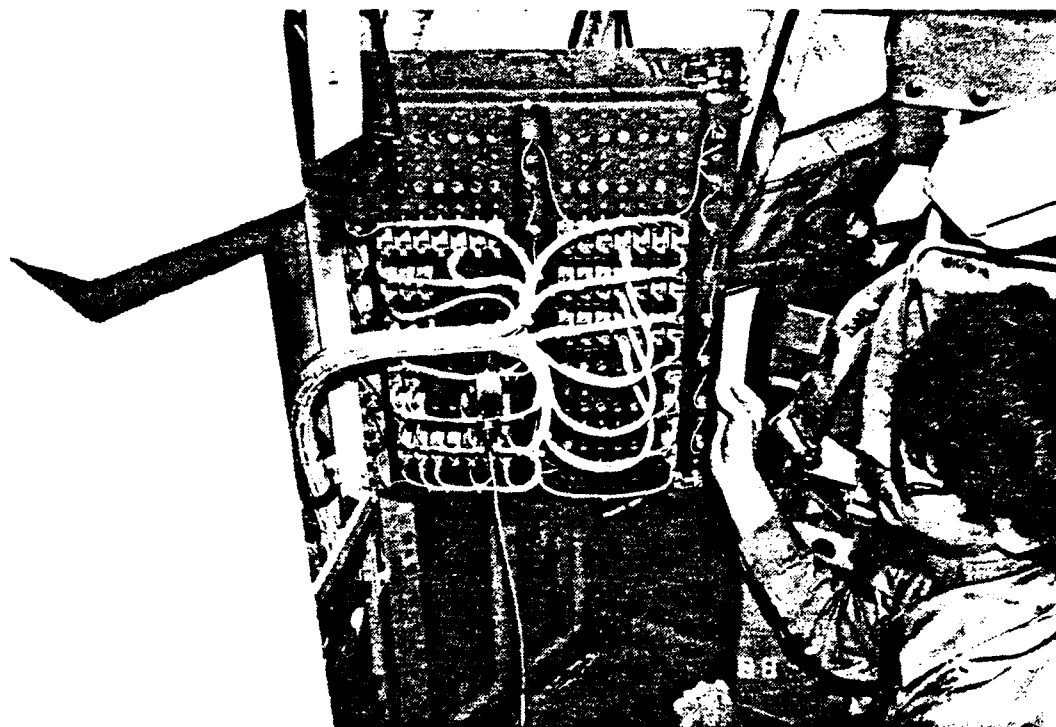
115v AC 400HZ 0B RT. HD

J

ENVIRONMENTAL TEST LABORATORY

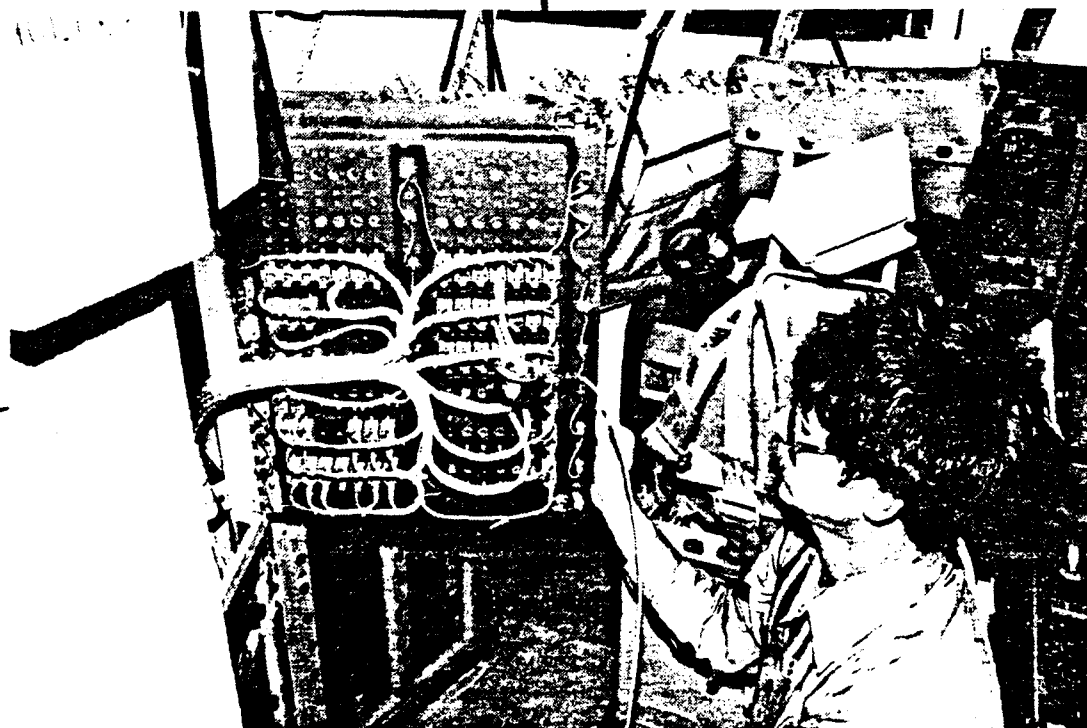
REF LOG NO. EU0436  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked       

LOG NO. EU0456  
By P. TURK  
Date 1-20-88  
Test No. 6216-540



115v AC 400HZ 0C RT. HD

K



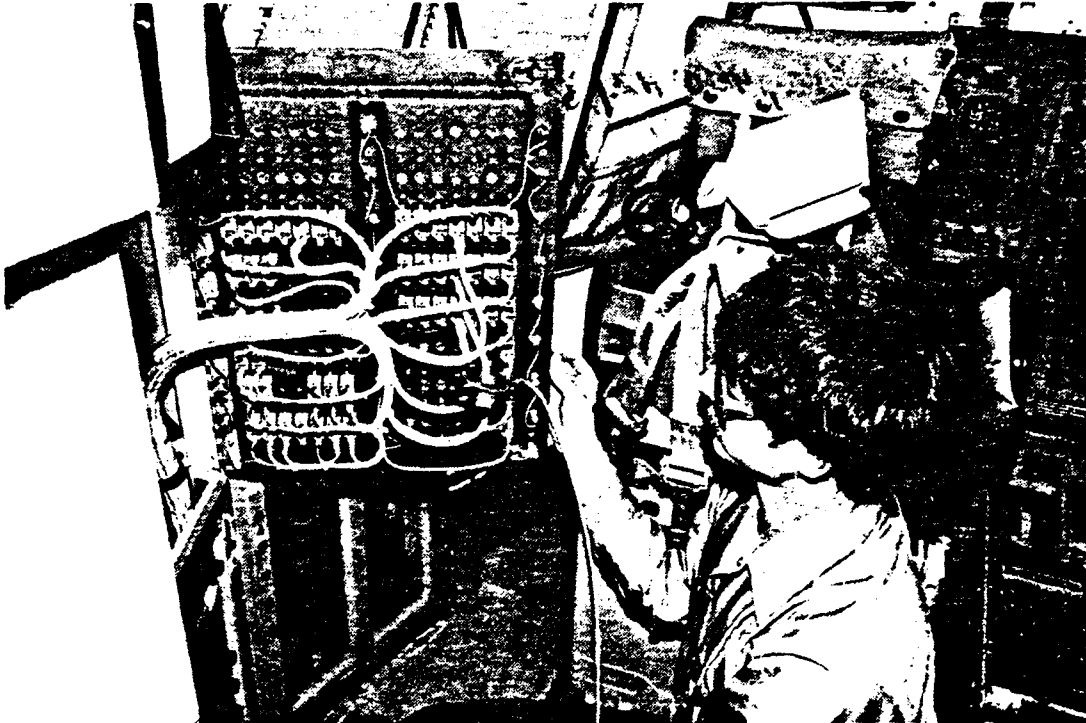
115v AC 400HZ 0A LFT. HD

L

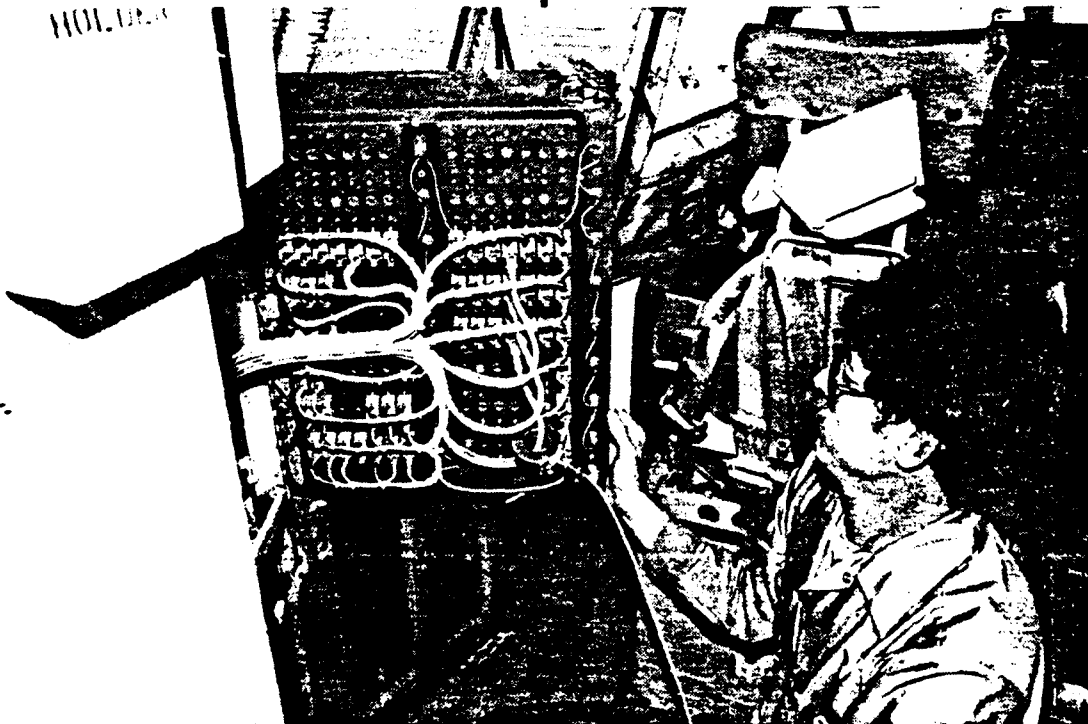
ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0436  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked     

LOG NO. EU0457  
By P. TUREK  
Date 1-20-88  
Test No. 6216-040



115v AC 400HZ ØB LFT. HD M



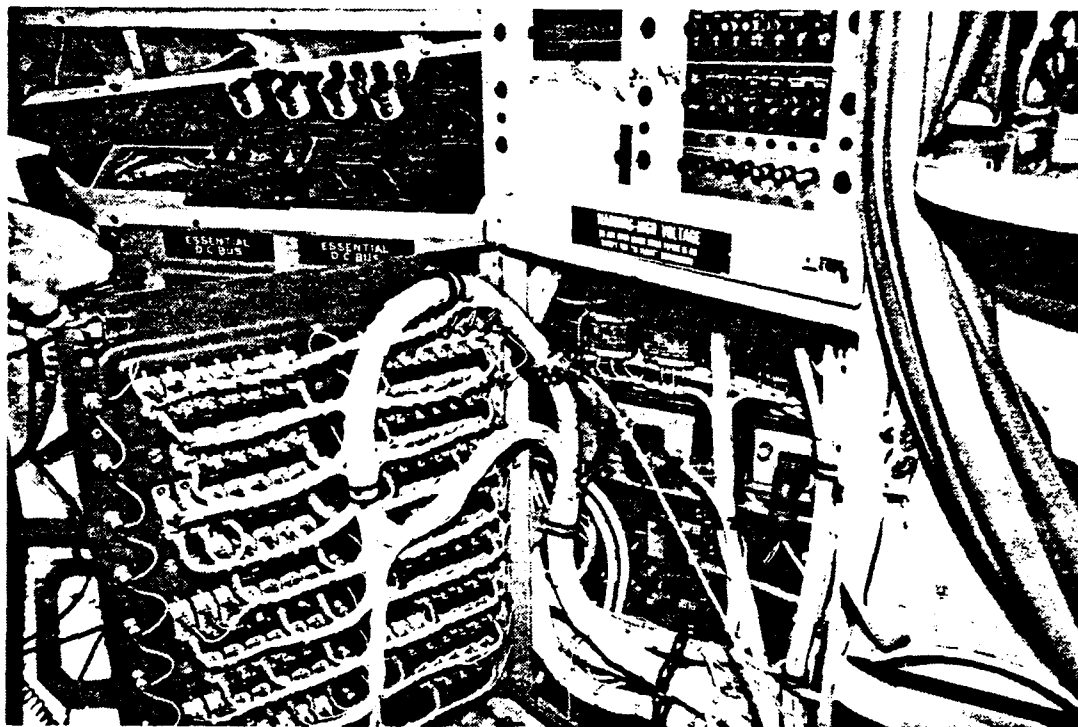
115v AC 400HZ ØC LFT. HD N



ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EUC436  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked       

LOG NO. EUC458  
By P. TUREK  
Date 1-20-88  
Test No. 6216-040



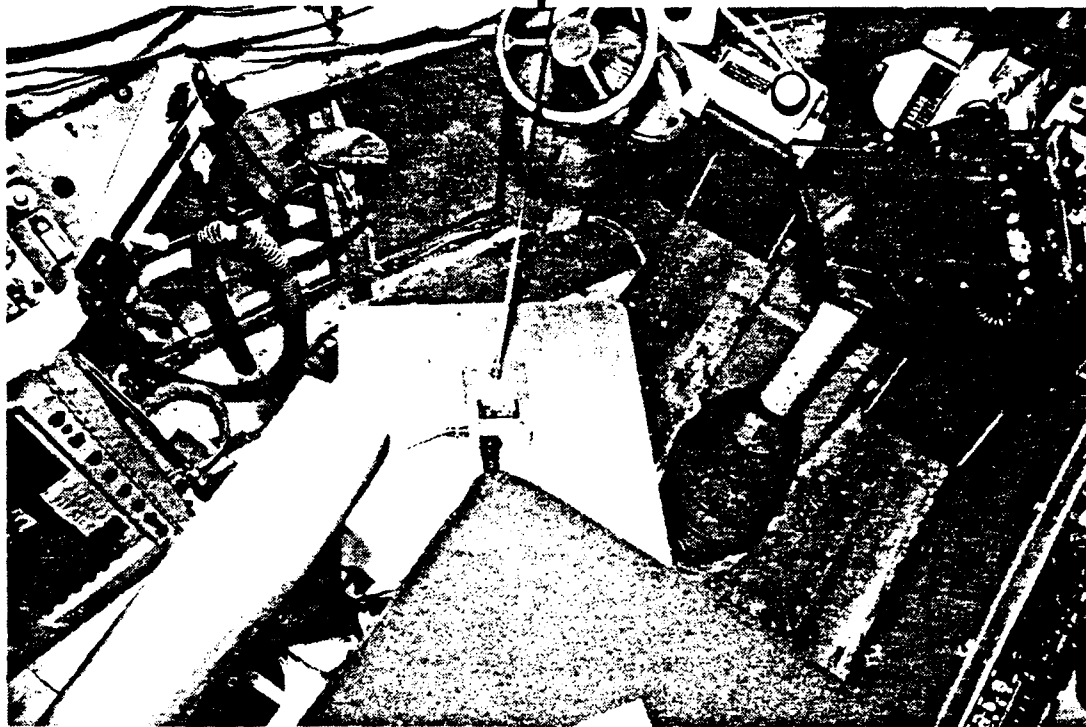
28v DC LITE

0

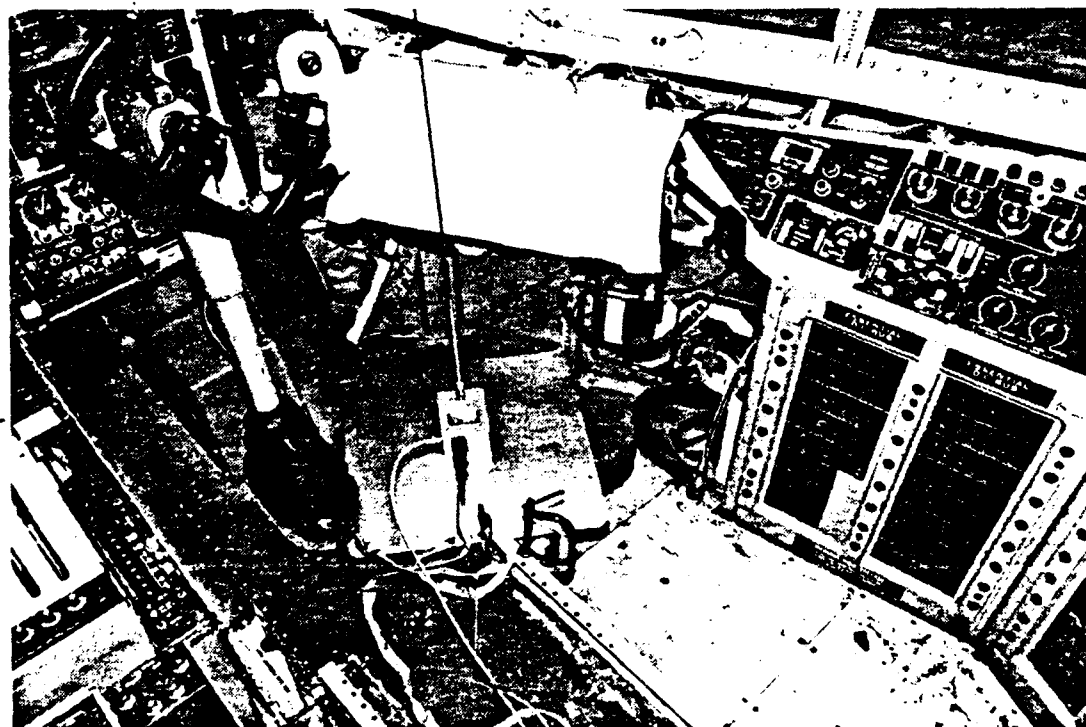
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REF LOG NO. EU 0437  
Requested By M JAMES  
Test Spec. ED 1309  
Checked     

LOG NO. EU 0459  
By P. TURK  
Date 1-20-88  
Test No. 6216-040



P,Q

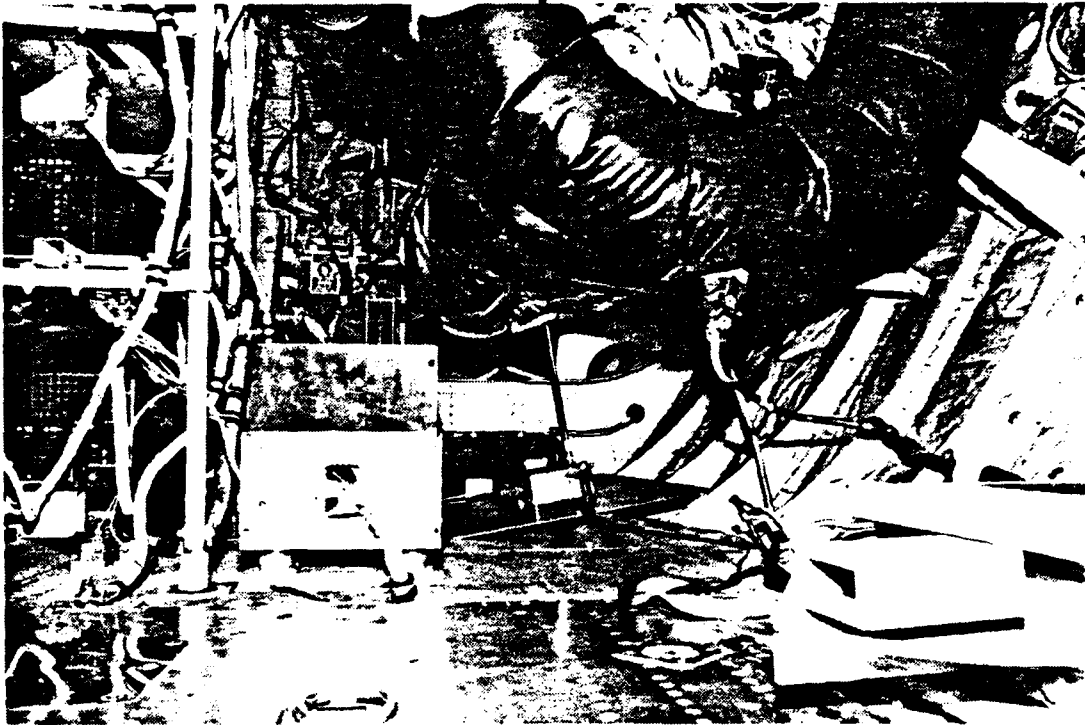


R

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0437  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked     

LOG NO. EU0460  
By P. TURK  
Date 1-20-68  
Test No. 6216-040



T

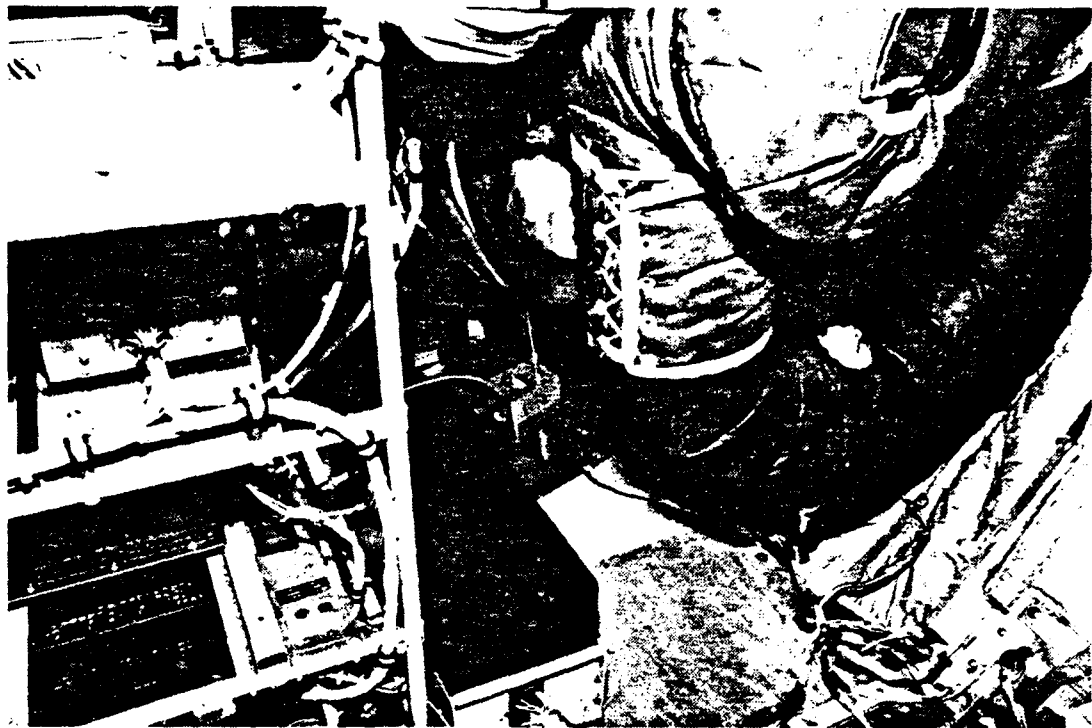


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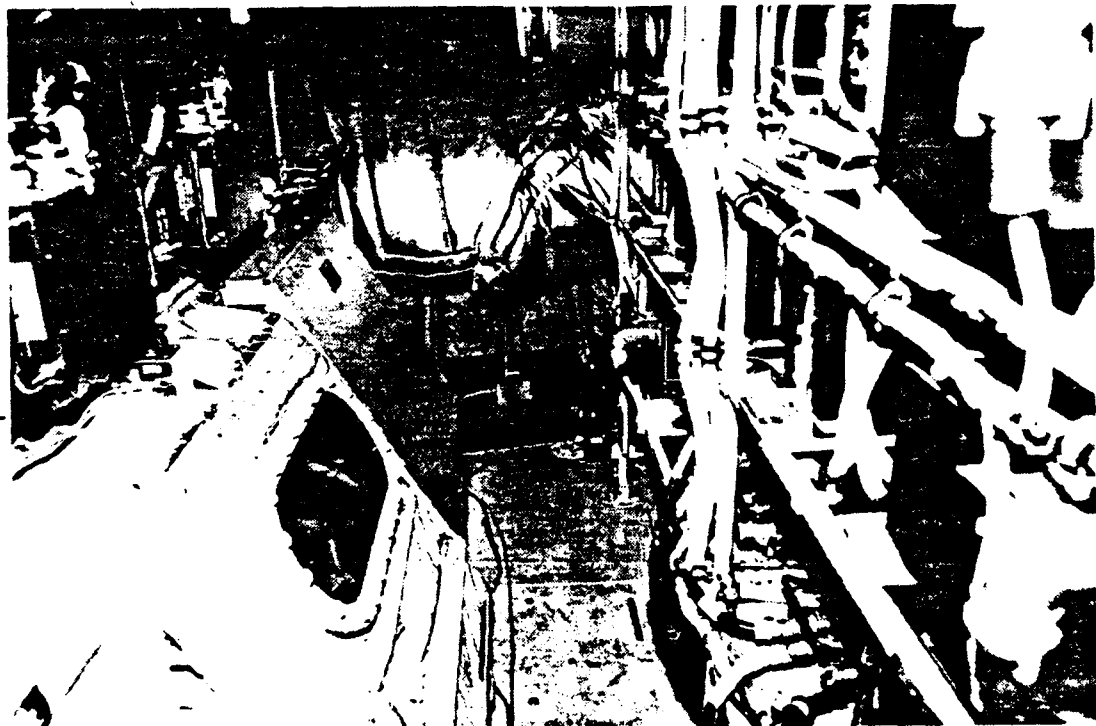
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REF LOG NO. EU0437  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU0461  
By P. TURK  
Date 1-20-88  
Test No. 6216-040



T

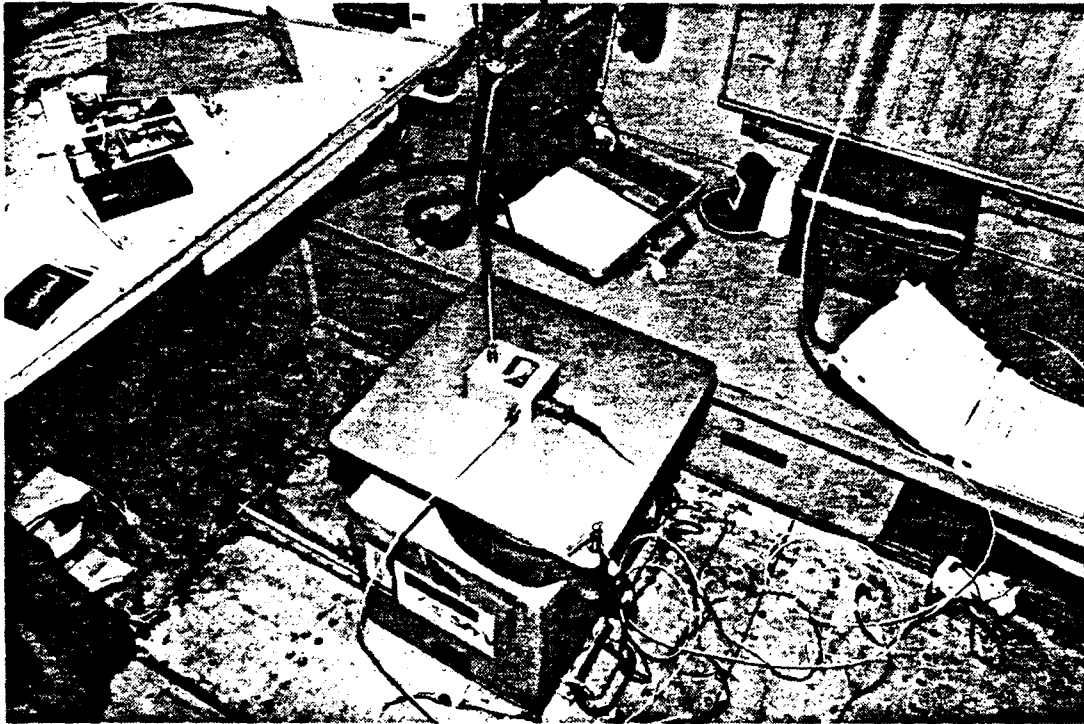


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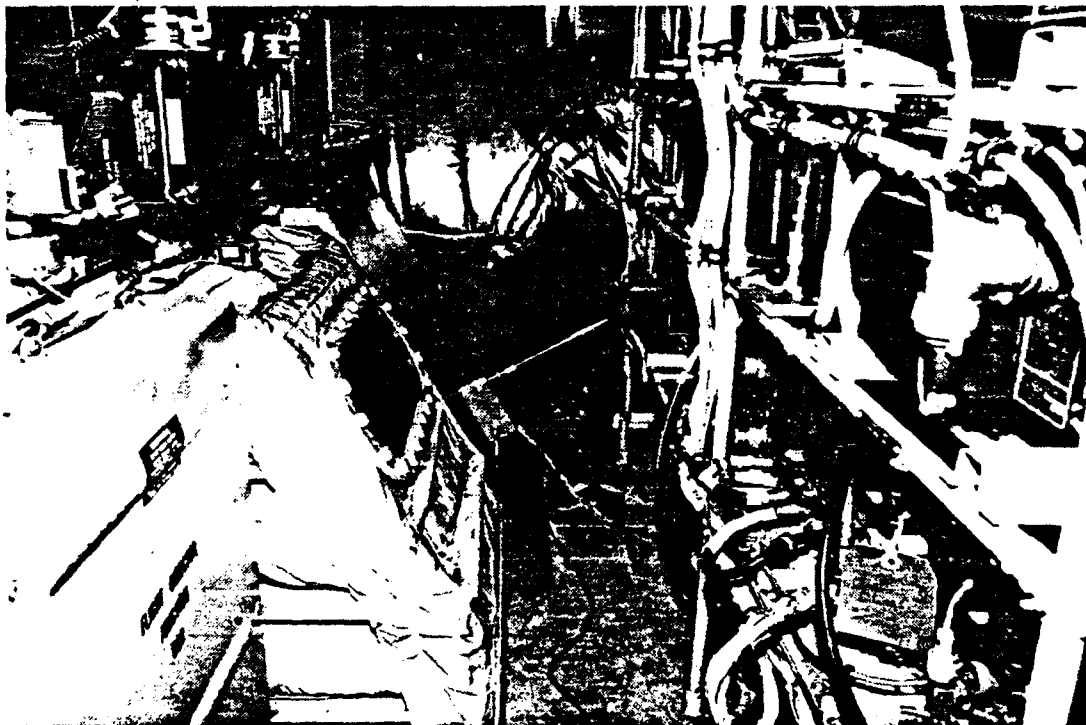
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REF LOG NO. EU0437  
Requested By M JAMES  
Test Spec. ED 1309  
Checked     

LOG NO. EU0462  
By P. TUREK  
Date 1-20-88  
Test No. 6216-040



S

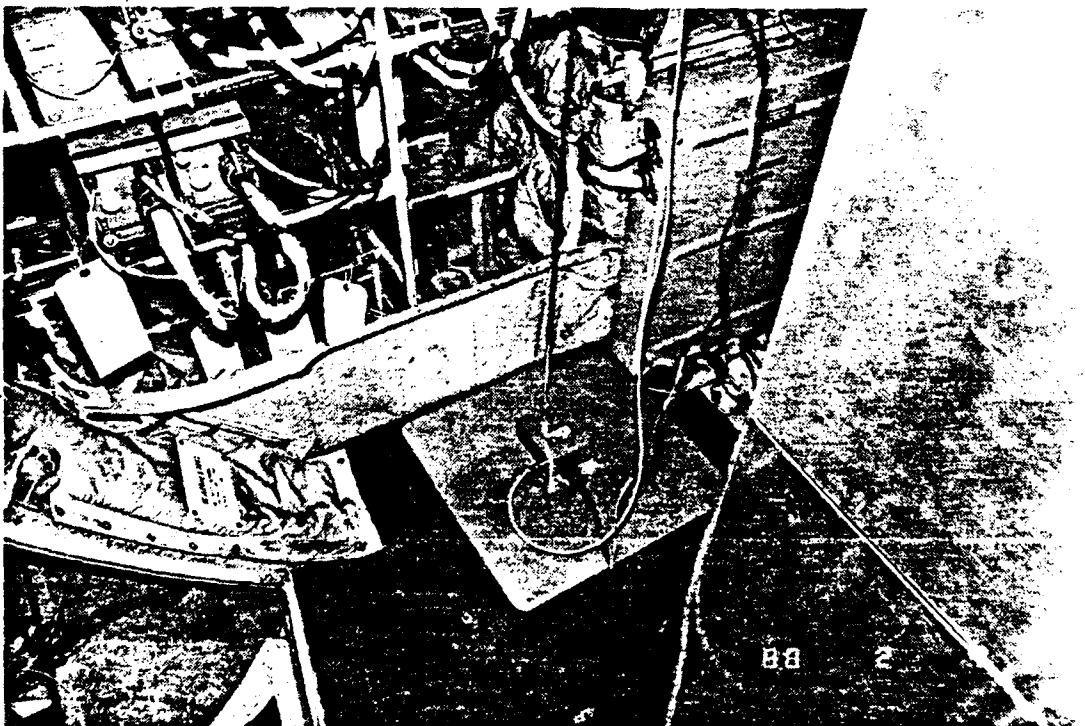
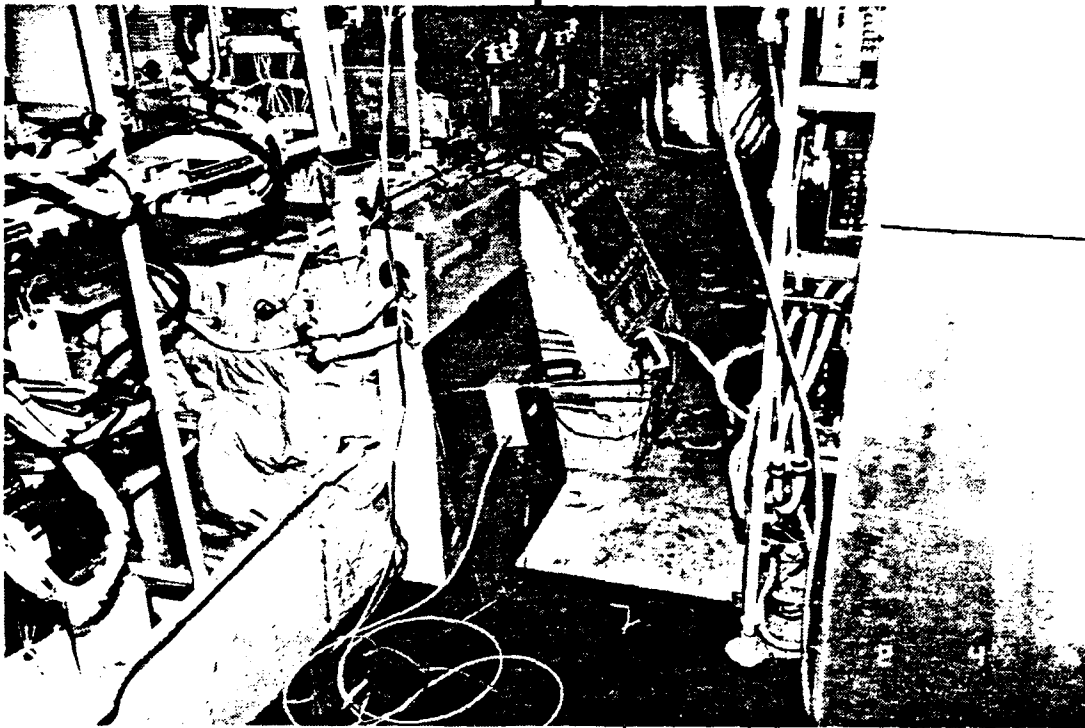


U

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU 0437  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked     

LOG NO. EU0463  
By P. TURK  
Date 1-20-68  
Test No. 6216-040



REV

ENVIRONMENTAL TEST LABORATORY

T. R. NO. 20829  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG SHEET

LOG NO. E40710  
By: P. TUREK  
Date 5-17-88  
Test No. 6216-042

TYPE of TEST: CONDUCTED EMISSION POWER LEADS (SCNS) - C-130H- POST INSTALLATION  
UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C SERNO \_\_\_\_\_  
EQUIPMENT USED: IFR 7550 SPECTRUM ANALYZER S/N 1185  
CP105 I PROBE

METHOD of TEST: \_\_\_\_\_

PARA 4.1.4.1

POWER LINE IDENT.	POWER LINE	PHOTO 0-1 MHZ	PHOTO 1-10MHZ	PHOTO 10-30MHZ		
DC ESSENTIAL BUS	A	A-1	A-2	A-3		
26v AC 400HZ ANTISKID	B	B-1	B-2	B-3		
115v AC 400HZ ØA ESS.	C	C-1	C-2	C-3		
115v AC 400HZ ØB ESS.	D	D-1	D-2	D-3		
115v AC 400HZ ØC ESS.	E	E-1	E-2	E-3		
115v AC 400HZ ØA MAIN	F	F-1	F-2	F-3		
115v AC 400HZ ØB MAIN	G	G-1	G-2	G-3		
115v AC 400HZ ØC MAIN	H	H-1	H-2	H-3		
115v AC 400HZ ØA RT. HD	I	I-1	I-2	I-3		
115v AC 400HZ ØB RT. HD	J	J-1	J-2	J-3		
115v AC 400HZ ØC RT. HD	K	K-1	K-2	K-3		
115v AC 400HZ ØA LFT. HD	L	L-1	L-2	L-3		
115v AC 400HZ ØB LFT. HD	M	M-1	M-2	M-3		
115v AC 400HZ ØC LFT. HD	N	N-1	N-2	N-3		
28v DC LITE	O	O-1	O-2	O-3		

SIGNIFICANT RESULTS: \_\_\_\_\_



SMITHS INDUSTRIES  
SLI AVIONIC SYSTEMS CORP.

SIZE  
**A**

CAGE CODE  
**35351**

DOCUMENT NO.

SHEET

REV

## ENVIRONMENTAL TEST LABORATORY

T. R. NO. 20829  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU0711  
By: P. TUREK  
Date 5-17-88  
Test No. 62116-042

# LOG SHEET

TYPE of TEST: RADIATED EMISSIONS (SCNS) - C-130H - POST INSTALLATION  
UNIT NOMENCLATURE: SLI MODELS 6216A 6216B 6216C SERNO                       
EQUIPMENT USED: IFR 7550 SPECTRUM ANALYZER S/N 1185

METHOD of TEST: VOR/HF - 0 dB RAD

[illegible]

**SIGNIFICANT RESULTS:** \_\_\_\_\_



**SMITHS INDUSTRIES**  
**BL AVIONIC SYSTEMS CORP.**

4141 Eastern Ave. S.E., Grand Rapids, MI 49518-8727

SIZE	CAGE CODE
A	35351

**DOCUMENT NO.**

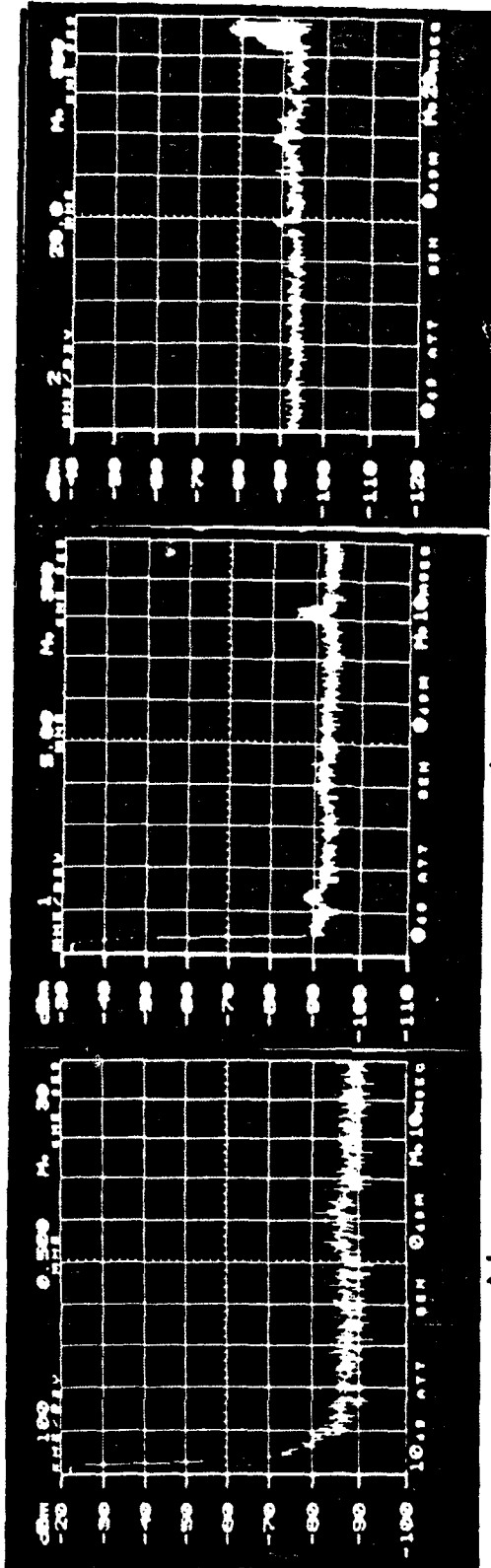
**SHEET**



ENVIRONMENTAL TEST LABORATORY

REF LOG NO. E40710  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

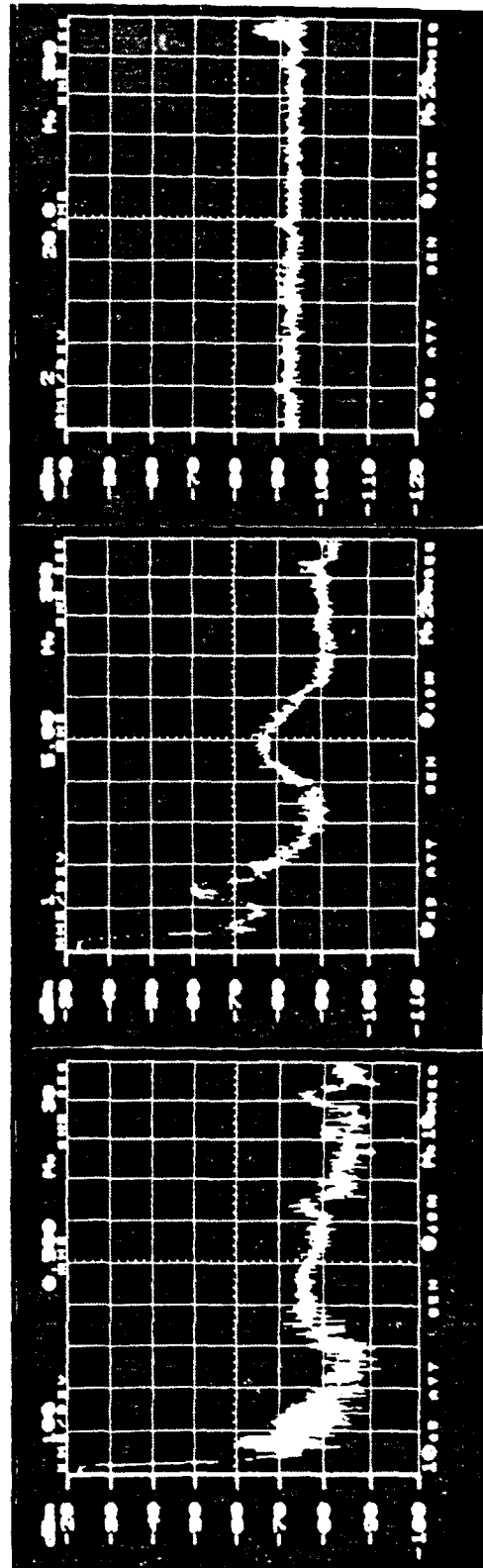
LOG NO. E40712  
By P. TUREK  
Date 5-17-88  
Test No. 6216-042



A3

A2

A1



B3

B2

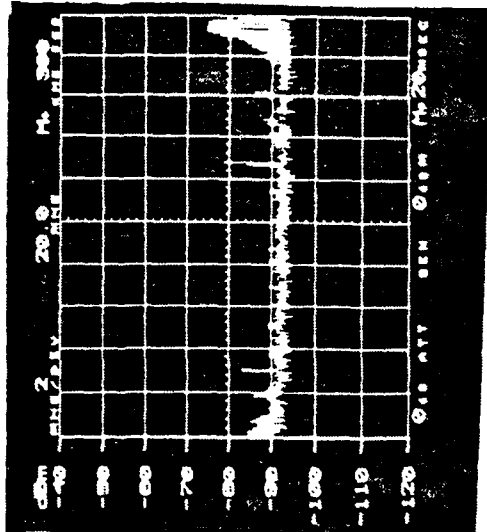
B1

POST INSTALLATION

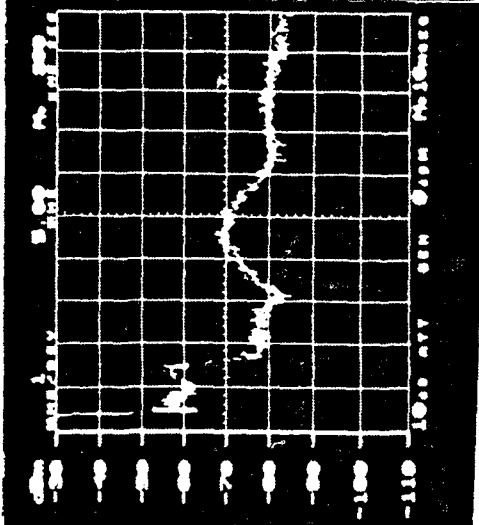
ENVIRONMENTAL TEST LABORATORY

REF LOG NO. E40710  
 Requested By M. JANES  
 Test Spec. ED 1309  
 Checked                     

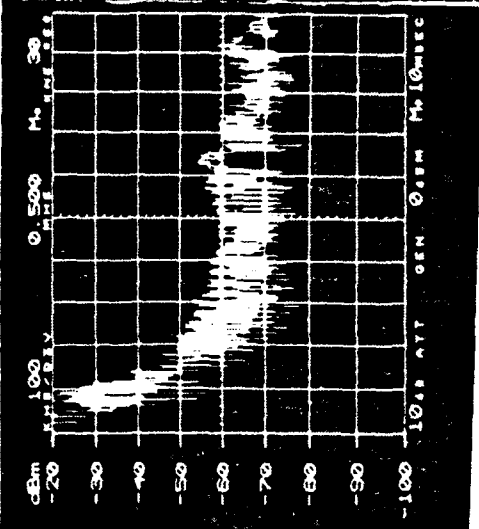
LOG NO. E40713  
 By P. TUREK  
 Date 5-17-88  
 Test No. 6216-042



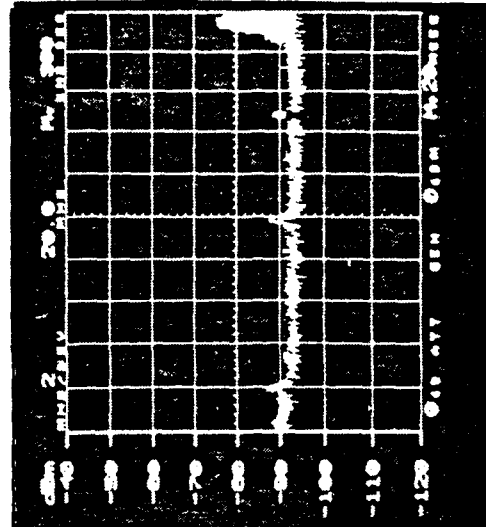
C1



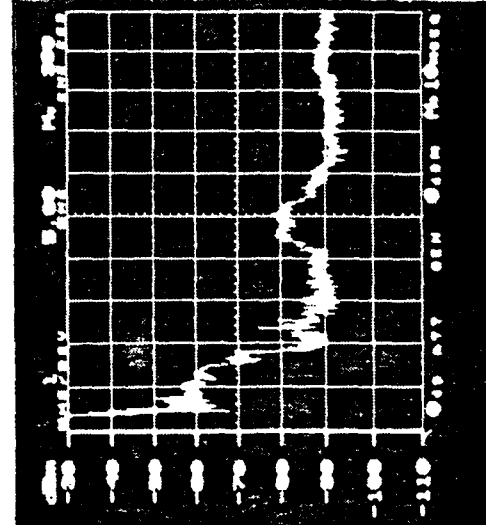
C2



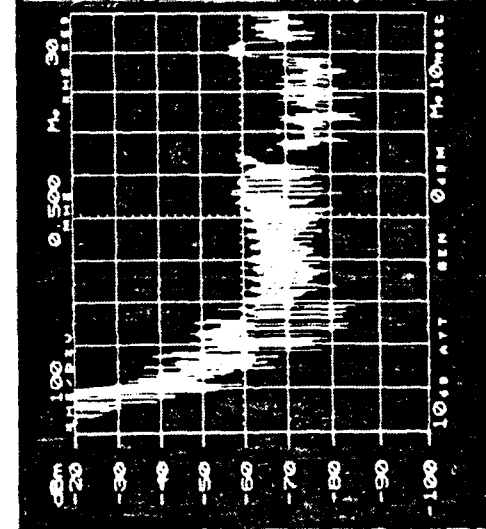
C3



D1



D2



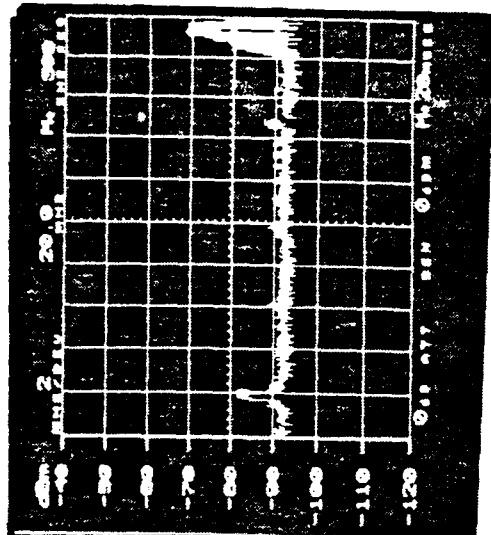
D3

POST INSTALLATION

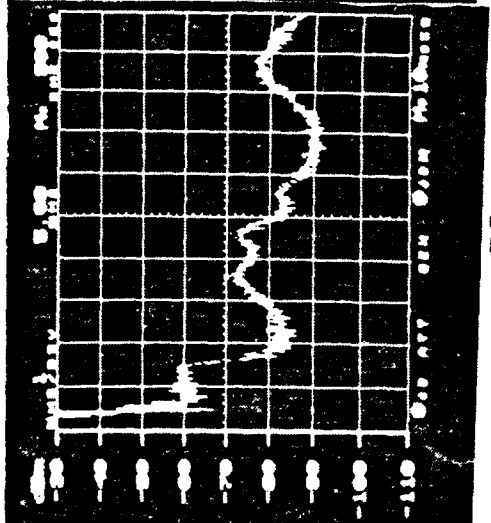
ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0710  
 Requested By M. JAMES  
 Test Spec. ED 1309  
 Checked \_\_\_\_\_

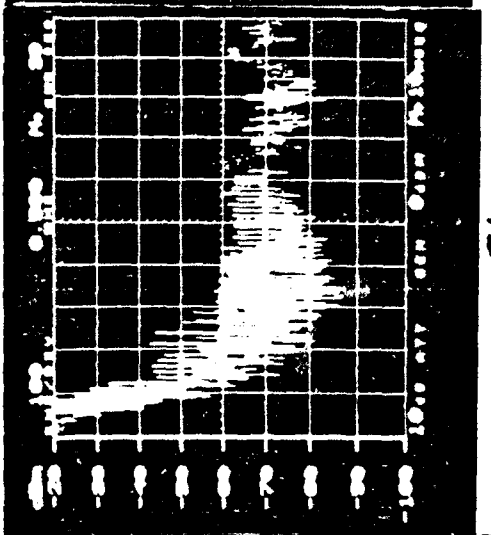
LOG NO. EU0714  
 By P. TUREK  
 Date 5-17-88  
 Test No. 6216-042



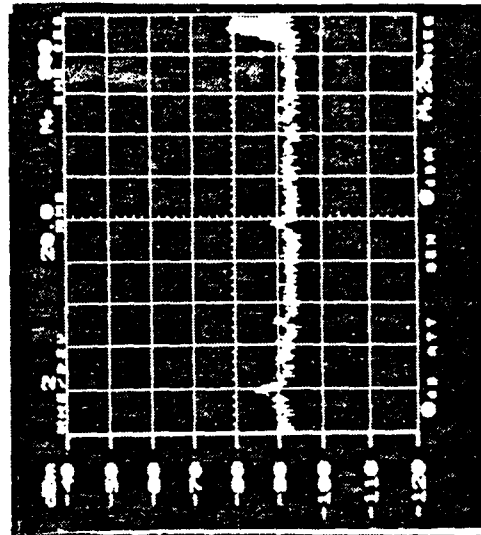
E3



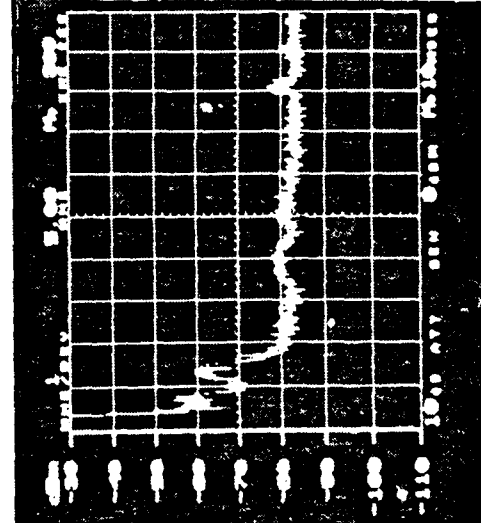
E2



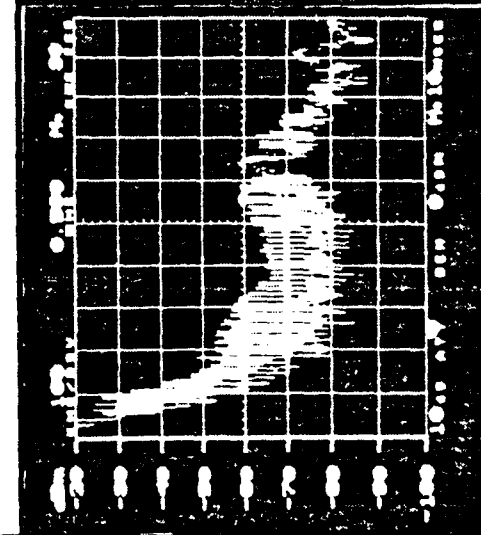
E1



F3



F2



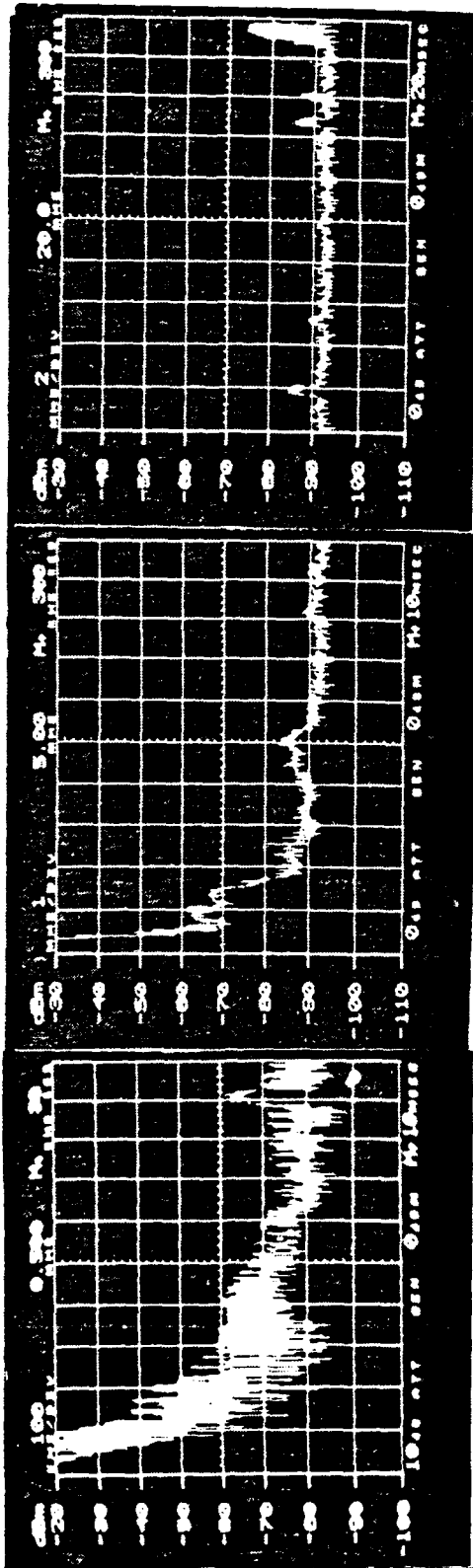
F1

POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0710  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

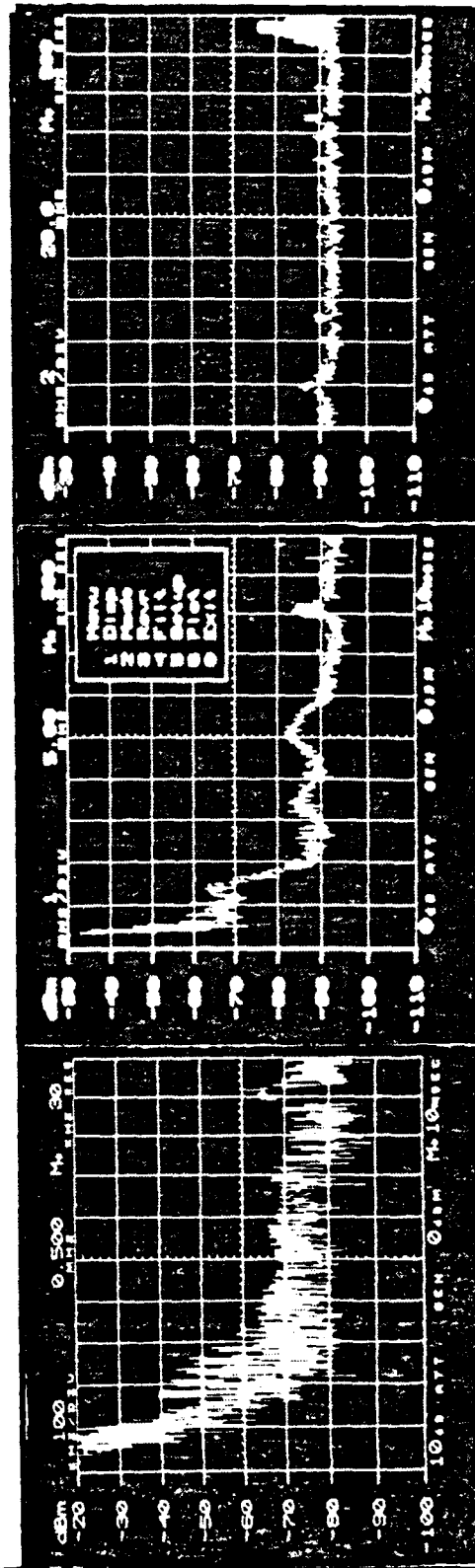
LOG NO. EU0715  
By P. TUREK  
Date 5-17-88  
Test No. 6216-042



G3

G2

G1



H3

H2

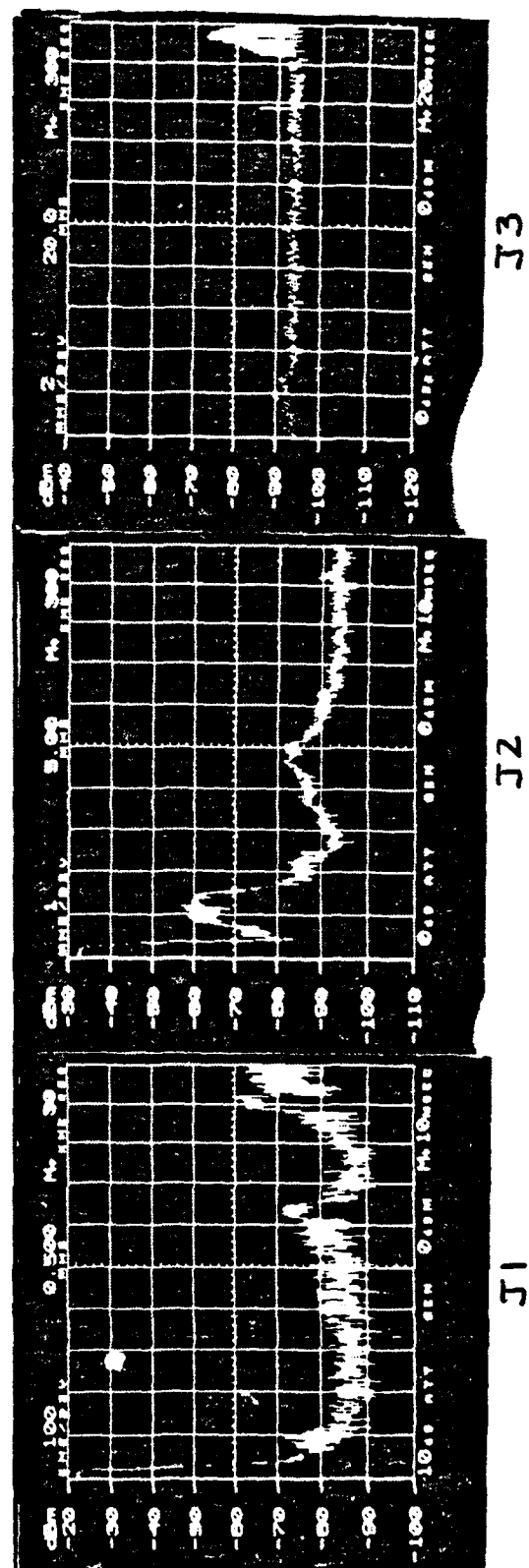
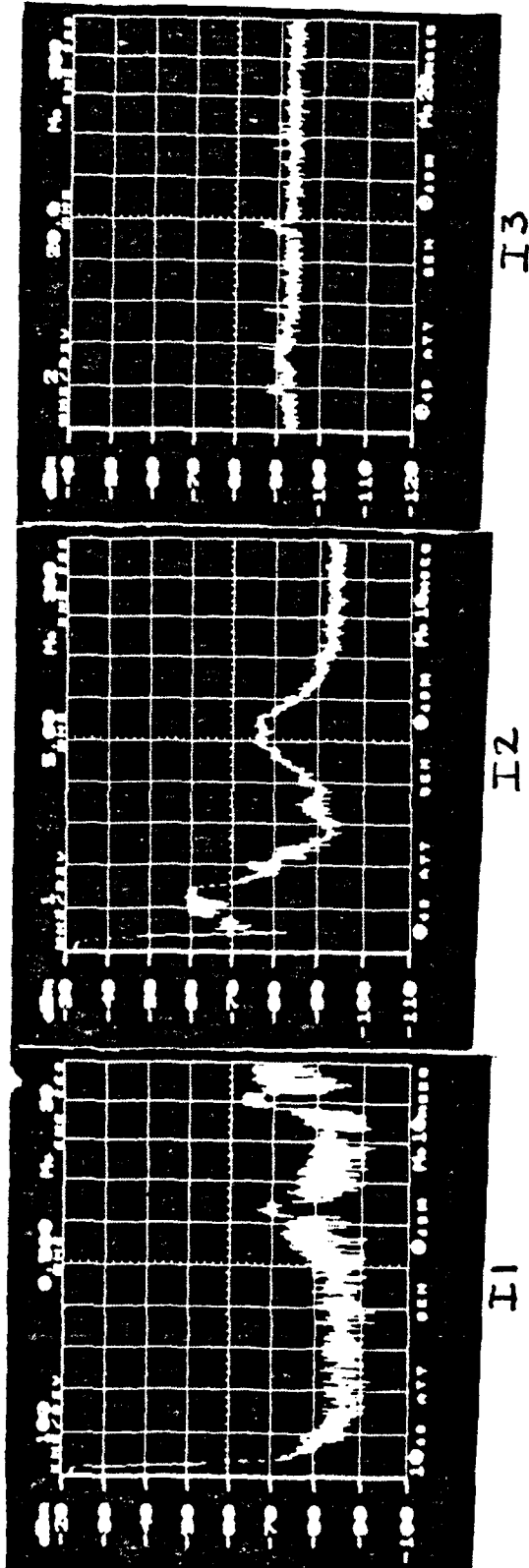
H1

POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EUC110  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EUC716  
By P. TUREK  
Date 5-17-88  
Test No. 6216-042

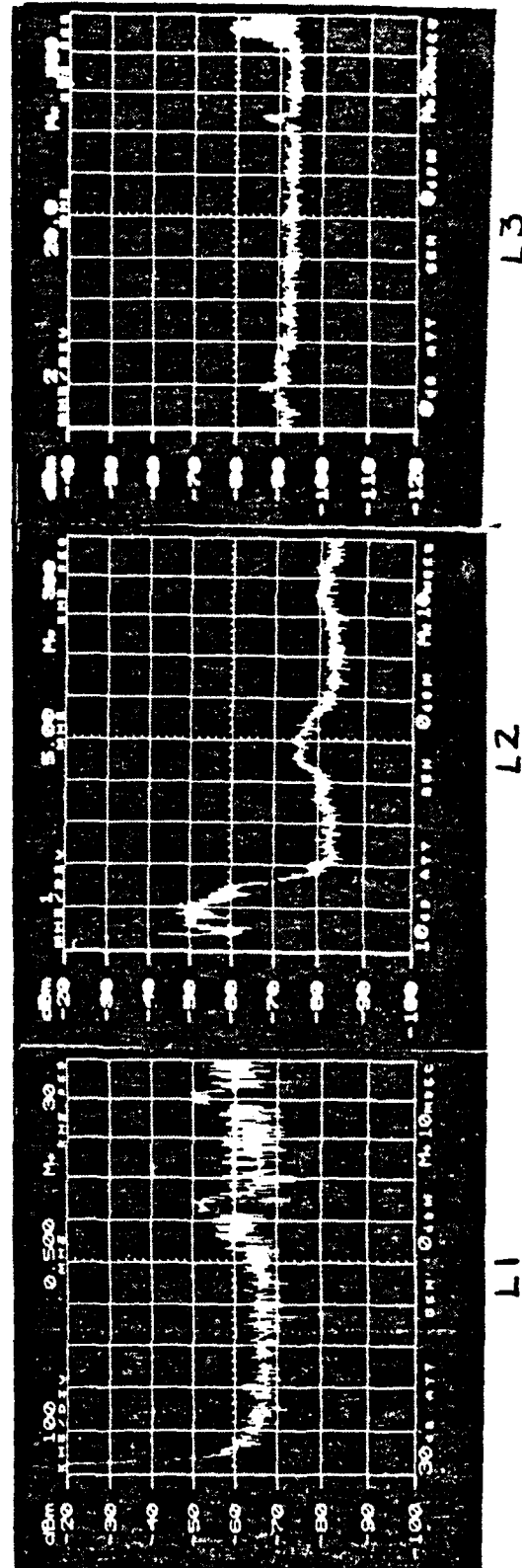
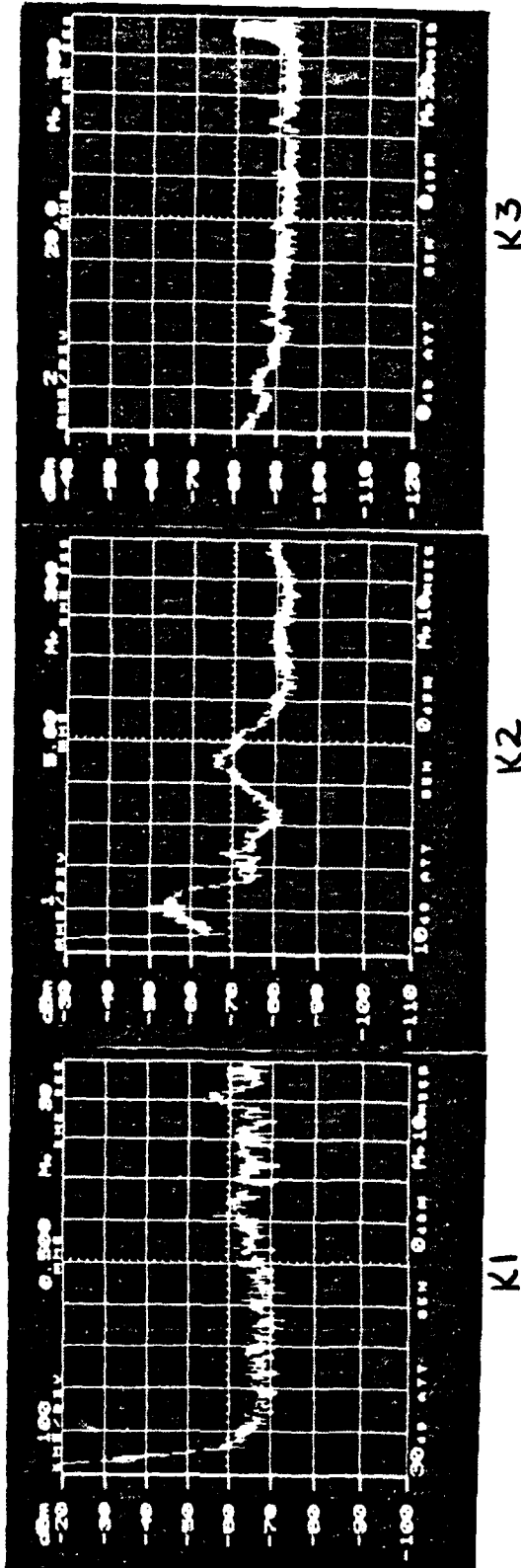


POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0710  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU0717  
By P. TUREK  
Date 5-17-88  
Test No. 6216-042

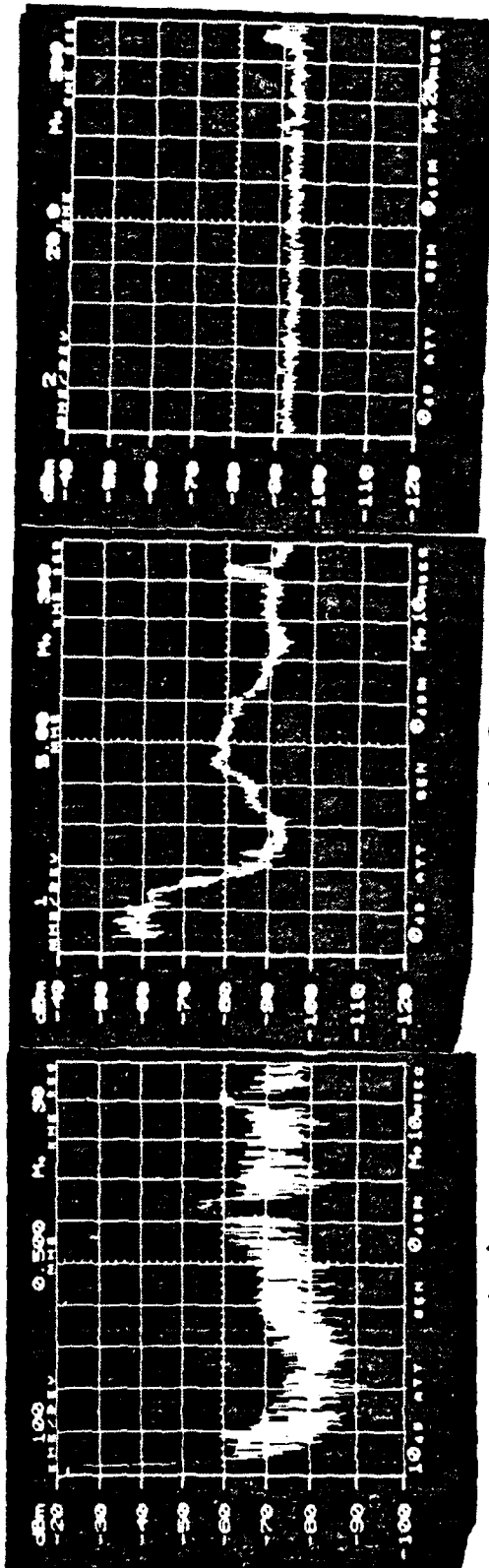


POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0710  
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Test Spec. ED 1309  
Checked \_\_\_\_\_

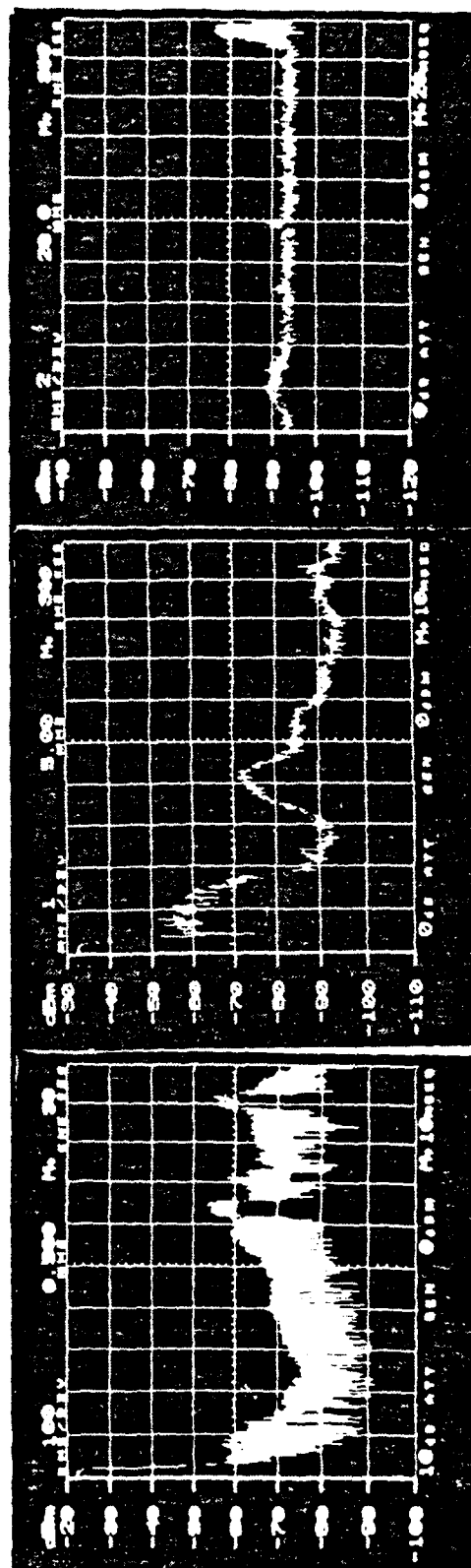
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By P. TUREK  
Date 5-17-88  
Test No. 6216-042



m3

m2

m1



N3

N2

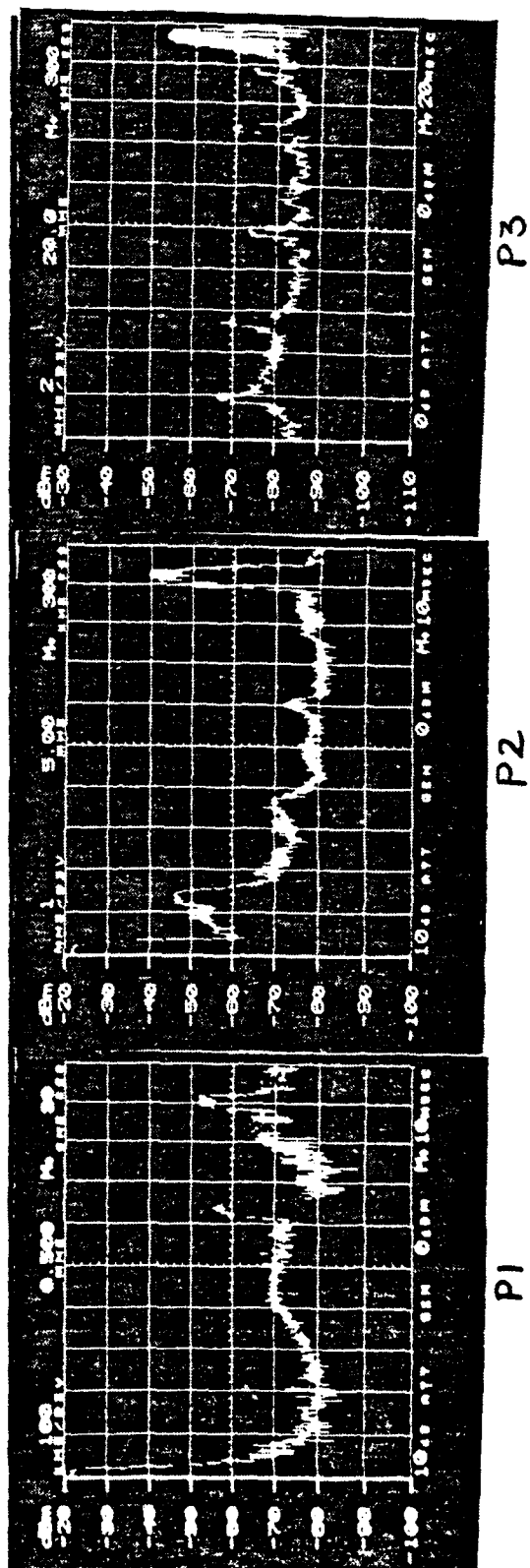
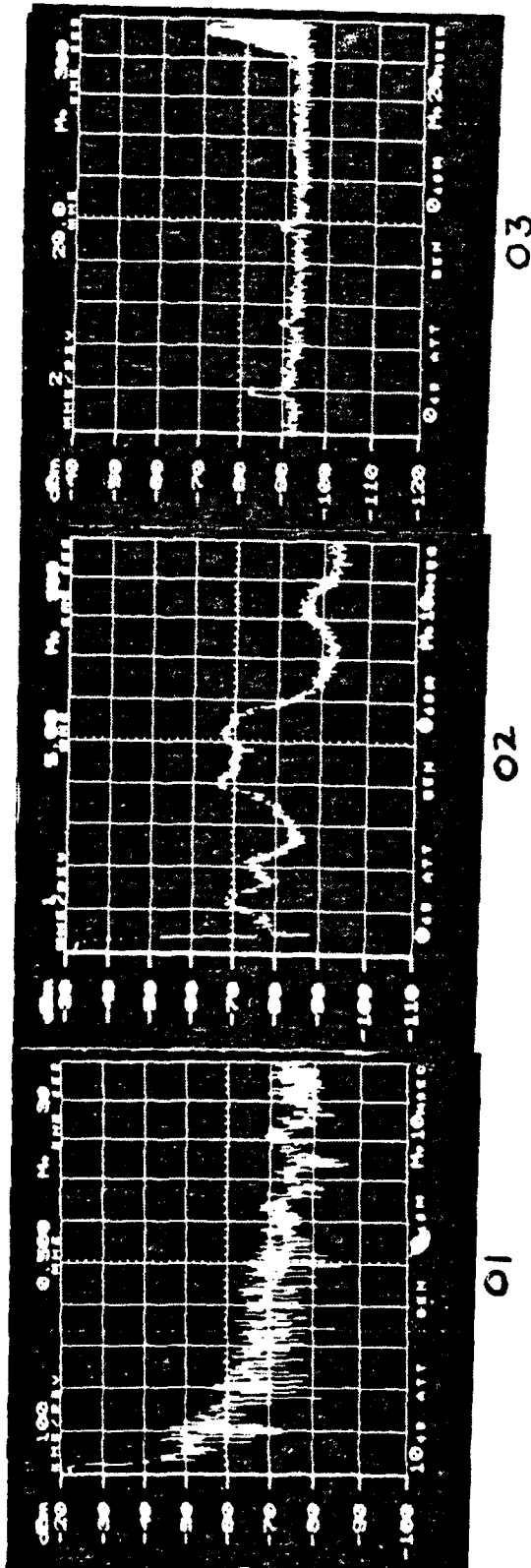
N1

POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0710  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU0719  
By P. TUREK  
Date 5-17-88  
Test No. 6216-042



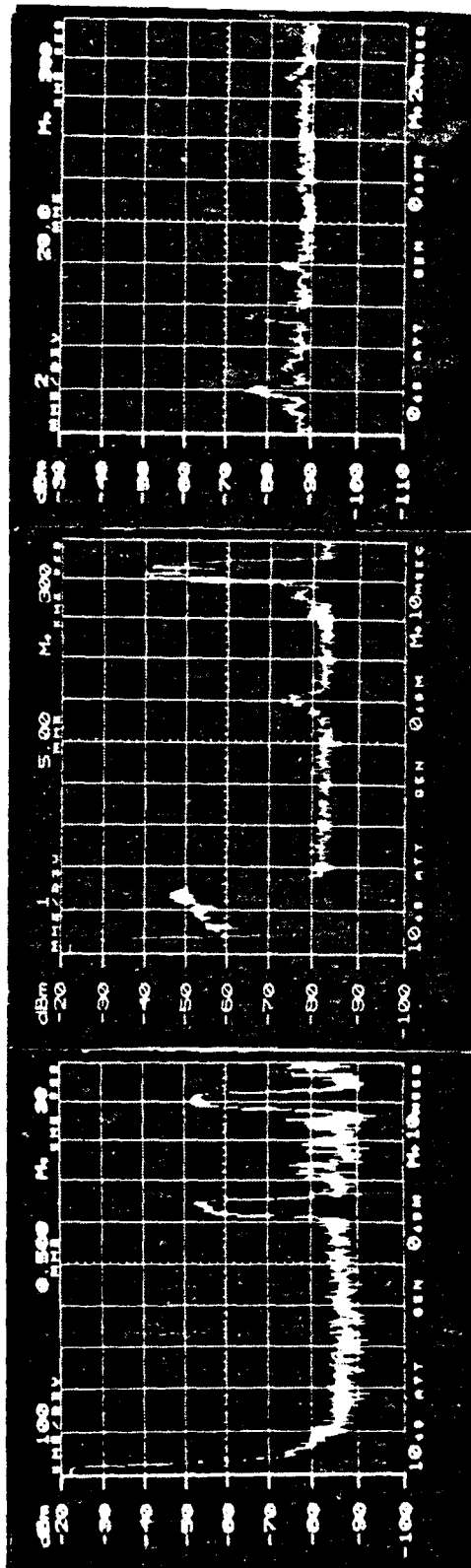
POST INSTALLATION



ENVIRONMENTAL TEST LABORATORY

REF LOG NO. E40711  
 Requested By M. JAMES  
 Test Spec. ED 1309  
 Checked \_\_\_\_\_

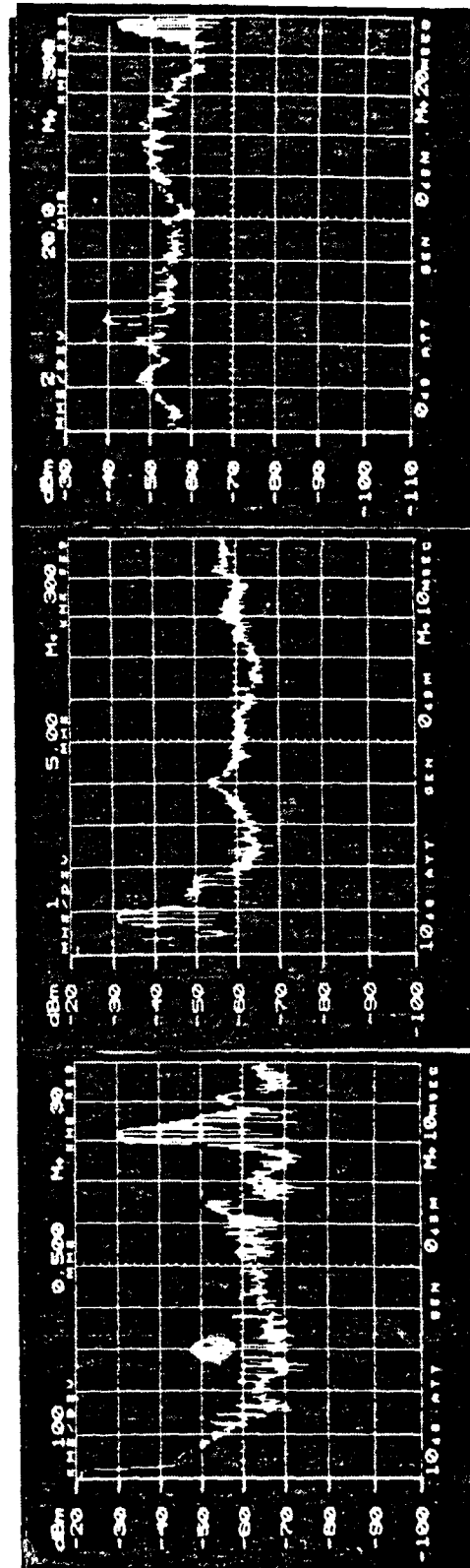
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 By P. TUREK  
 Date 5-17-88  
 Test No. 6216-042



Q3

Q2

Q1



R3

R2

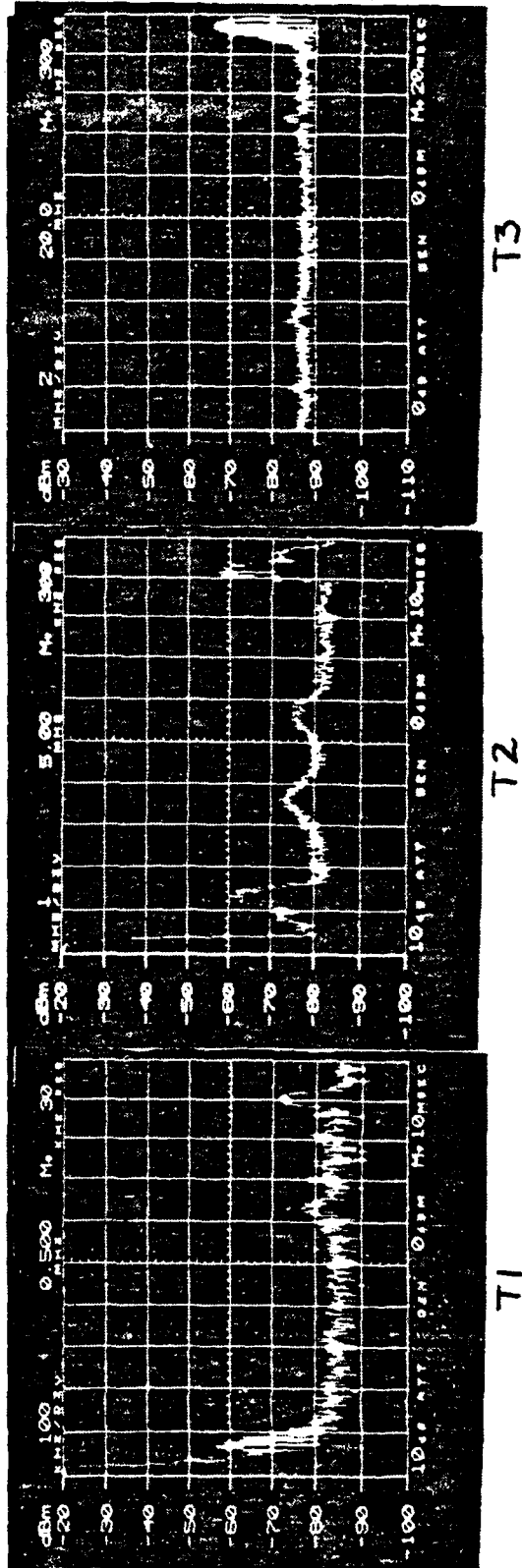
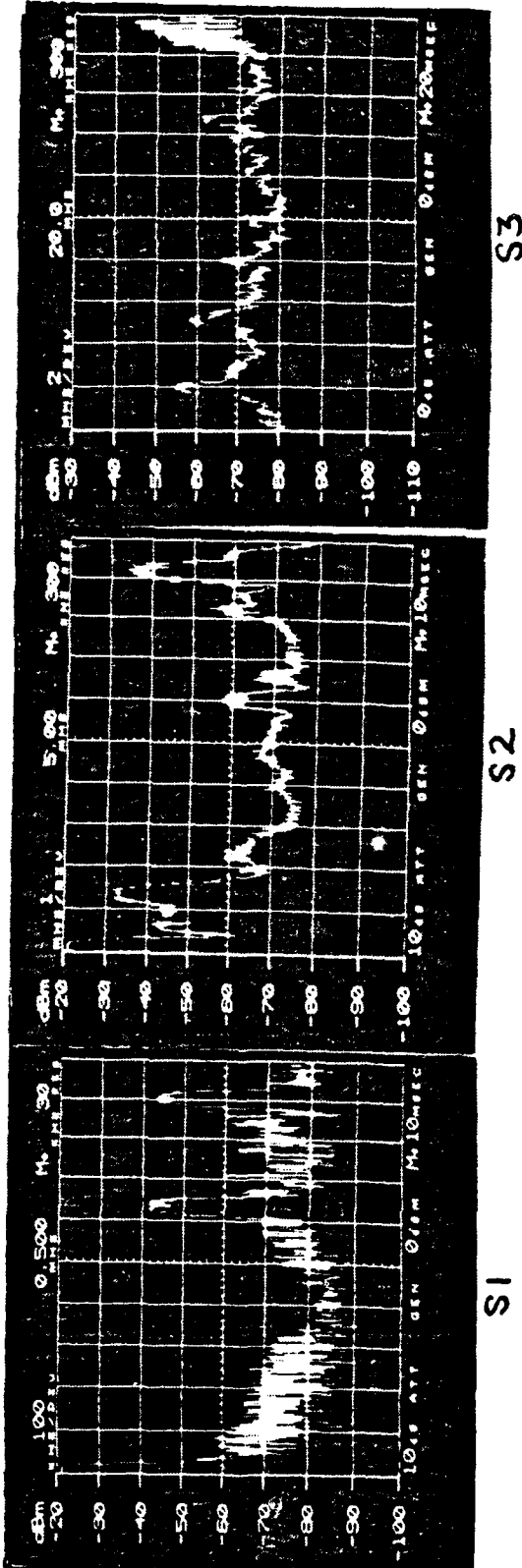
R1

POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. E40711  
 Requested By M. JAMES  
 Test Spec. ED 1309  
 Checked     

LOG NO. E40721  
 By P. TUREK  
 Date 5-17-88  
 Test No. 6216-042

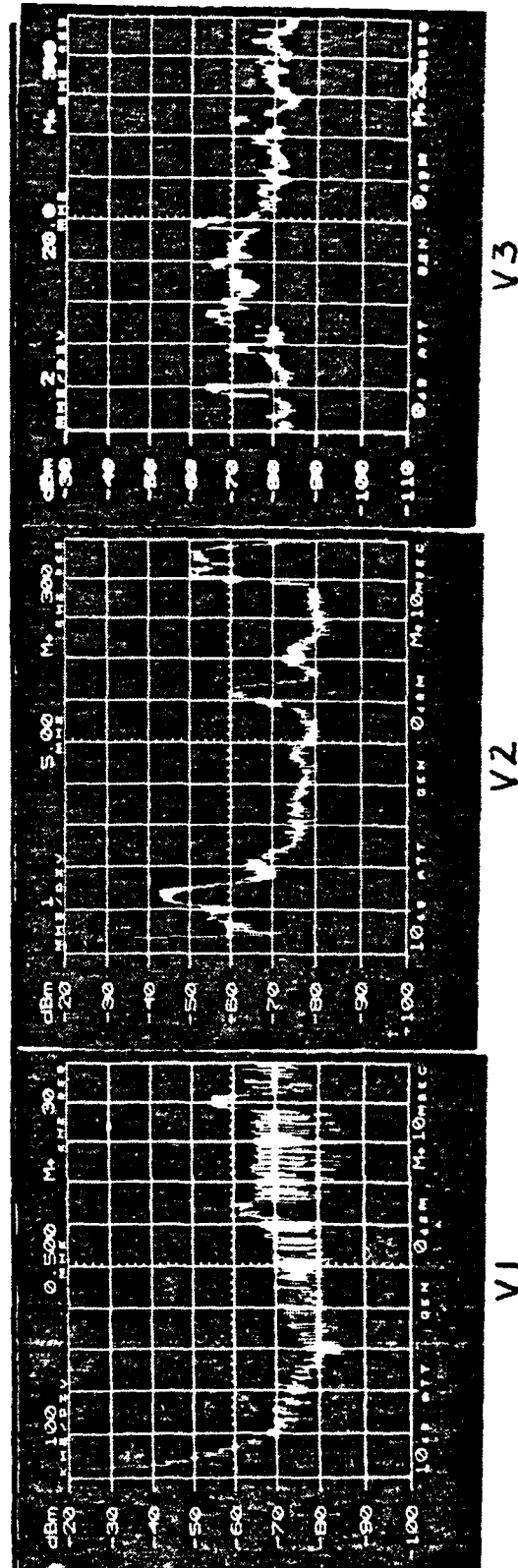
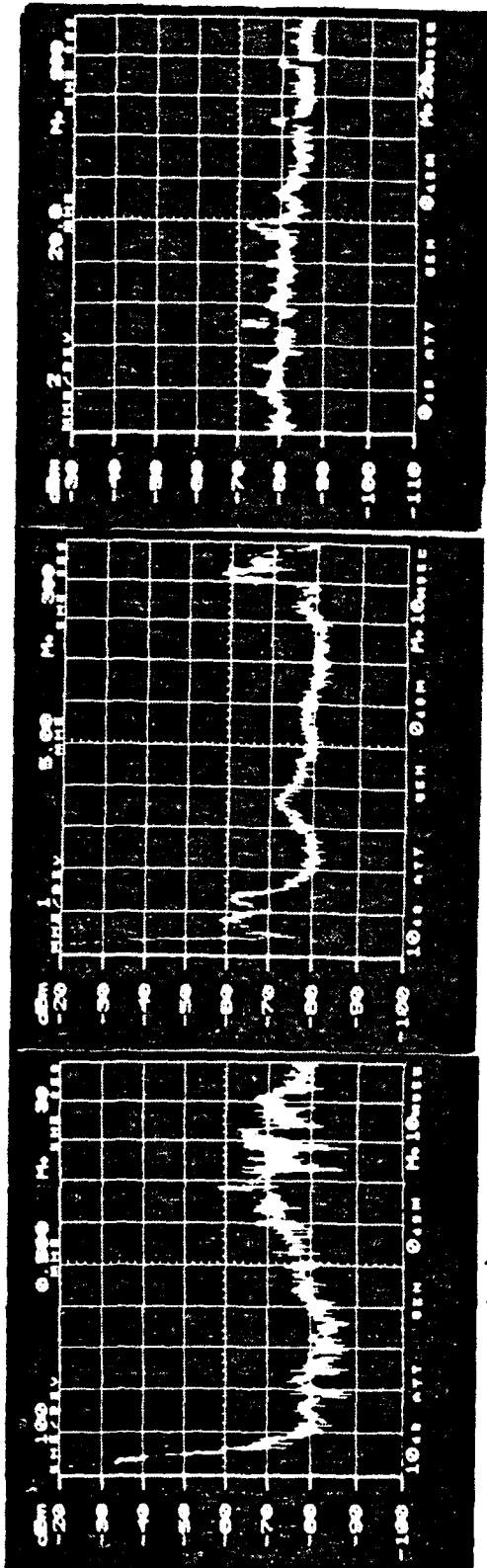


POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU0711  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU0722  
By P. TUREK  
Date 5-17-88  
Test No. 6216-042

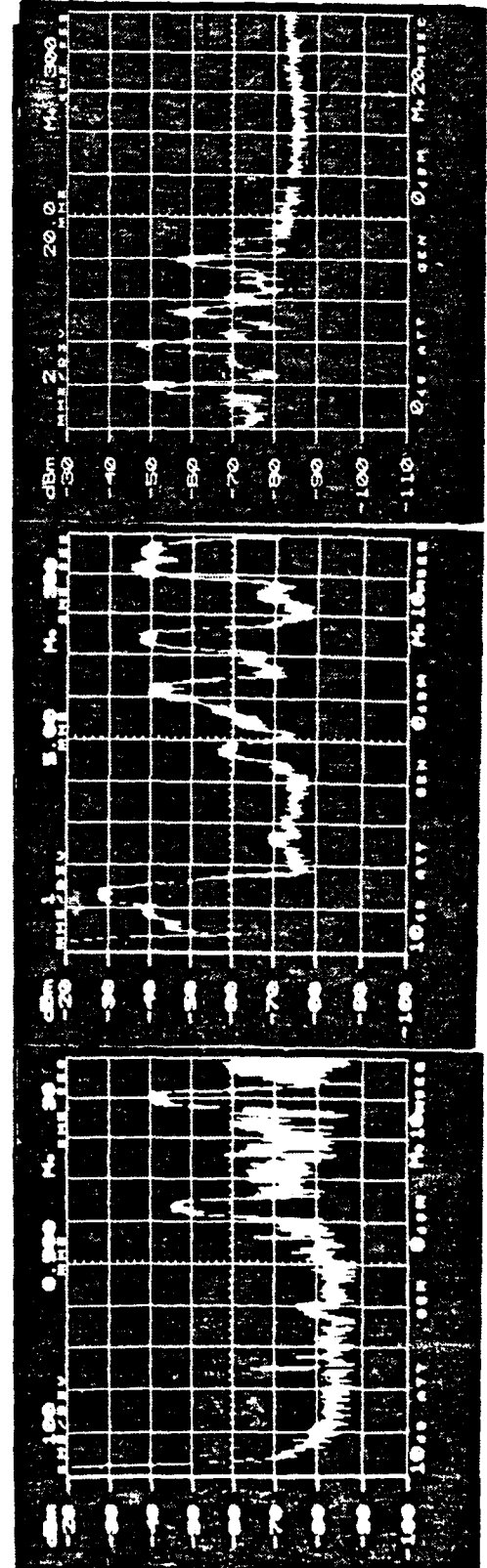
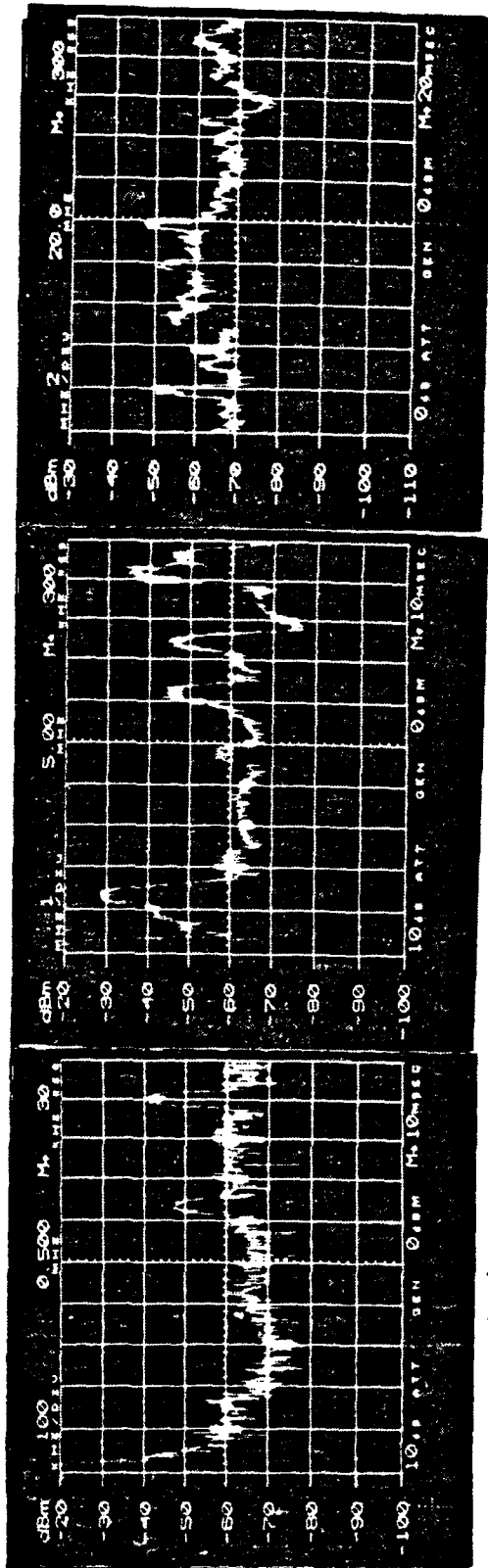


POST INSTALLATION

ENVIRONMENTAL TEST LABORATORY

REF LOG NO. EU 0711  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG NO. EU 0723  
By P. TUREK  
Date 5-17-88  
Test No. 6216-042



POST INSTALLATION



ENVIRONMENTAL TEST LABORATORY

REV

T. R. NO. 20829  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG SHEET

LOG NO. EU0810  
By: P. TUREK  
Date 5-17-88  
Test No. 6216-044

TYPE of TEST: C-130 PRE/POST EMI RESULTS

UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C SERNO \_\_\_\_\_

REFERENCE LOG NO'S.: EU0438, EU0439 AND EU0712, EU0713

POWER LINE IDENT.	PHOTO NO.	SCNS DELTA	FREQ. RANGE MHZ
DC	A1	LOWER BY 5 TO 10dB	.1 TO 1
	A2	PRE HIGHER BY 10dB AT 2.5 MHZ, OTHERWISE LOWER BY UP TO 5dB	1 TO 10
	A3	SIMILAR EXCEPT FOR RISE OF 7dB AROUND 29 MHZ	10 TO 30
26vAC	B1	NO APPRECIABLE CHANGE	.1 TO 1
	B2	POST HIGHER BY UP TO 8dB FROM 4 TO 6 MHZ	1 TO 10
	B3	SIMILAR EXCEPT FOR 5dB RISE ON PRE AROUND 29 MHZ	10 TO 30
115v $\phi$ A ESS.	C1	SIMILAR EXCEPT PRE SLIGHTLY HIGHER AT .5 MHZ	.1 TO 1
	C2	5 TO 10dB HIGHER FROM 4.5 TO 10 MHZ	1 TO 10
	C3	SIMILAR EXCEPT FOR 5dB RISE AROUND 29 MHZ	10 TO 30

SIGNIFICANT RESULTS: \_\_\_\_\_



SMITHS INDUSTRIES  
SLI AVIONIC SYSTEMS CORP.

4141 Eastern Ave. S.E., Grand Rapids, MI 49518-8727

SIZE  
**A**

CAGE CODE  
**35351**

DOCUMENT NO.

SHEET

ENVIRONMENTAL TEST LABORATORY

REV

T. R. NO. 20829  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG SHEET

LOG NO. EU0611  
By: P. TUREK  
Date 5-17-88  
Test No. 6216-044

TYPE of TEST: C-130 PRE/POST EMI RESULTS

UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C

SERNO \_\_\_\_\_

REFERENCE LOG NO'S.: EU0439, EU0440 AND EU0713, EU0714

POWER LINE IDENT.	PHOTO NO.	SCNS DELTA	FREQ. RANGE MHZ
115v $\phi$ B ESS.	D1	HIGHER BY UP TO 10dB FROM .1 TO 1.0 MHZ	.1 TO 1
	D2	SIMILAR EXCEPT BACKGROUND IS LOWER	1 TO 10
	D3	SIMILAR EXCEPT HIGHER BY 10dB AROUND 29 MHZ	10 TO 30
115v $\phi$ C ESS.	E1	UP TO 5dB HIGHER	.1 TO 1
	E2	UP TO 17dB HIGHER FROM 3.5 TO 4.5 MHZ & UP TO 10dB BALANCE OF FREQ. RANGE	1 TO 10
	E3	SIMILAR EXCEPT FOR 8dB RISE AROUND 29 MHZ	10 TO 30
$\phi$ A MAIN	F1	NO CHANGE	.1 TO 1
	F2	SIMILAR	1 TO 10
	F3	SIMILAR	10 TO 30

SIGNIFICANT RESULTS: \_\_\_\_\_



SMITHS INDUSTRIES  
SLI AVIONIC SYSTEMS CORP.

4141 Eastern Ave. S.E., Grand Rapids, MI 49518-8727

SIZE

A

CAGE CODE

35351

DOCUMENT NO.

SHEET

ENVIRONMENTAL TEST LABORATORY

REV

T. R. NO. 20829  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG SHEET

LOG NO. EU0812  
By: P. TUREK  
Date 5-17-88  
Test No. 6216-044

TYPE of TEST: C-130 PRE/POST EMI RESULTS  
UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C SERNO \_\_\_\_\_  
REFERENCE LOG NO'S.: EU0441, EU0442 AND EU0715, EU0716

POWER LINE IDENT	PHOTO NO.	SCNS DELTA	FREQ. RANGE MHZ
ØB MAIN	G1	UP TO 20dB HIGHER FROM .1 TO .2 MHZ & UP TO 5dB LOWER & HIGHER BETWEEN .5 TO 1 MHZ	.1 TO 1
	G2	SIMILAR	1 TO 10
	G3	SIMILAR	10 TO 30
ØC MAIN	H1	SLIGHTLY HIGHER BY UP TO 6dB	.1 TO 1
	H2	UP TO 8dB HIGHER AT 3.5, 5.0 AND 8 MHZ	1 TO 10
	H3	6dB HIGHER AT 29 MHZ	10 TO 30
ØA RT. HD.	I1	SIMILAR	.1 TO 1
	I2	SIMILAR	1 TO 10
	I3	PRE 8dB HIGHER AT 29 MHZ	10 TO 30
ØB RT. HD.	J1	SIMILAR	.1 TO 1
	J2	SIMILAR	1 TO 10
	J3	HIGHER BY 16dB AROUND 29 MHZ	10 TO 30

SIGNIFICANT RESULTS: \_\_\_\_\_  
\_\_\_\_\_



SMITHS INDUSTRIES  
SLI AVIONIC SYSTEMS CORP.

4141 Eastern Ave. S.E., Grand Rapids, MI 49518-8727

SIZE

A

CAGE CODE

35351

DOCUMENT NO.

SHEET



ENVIRONMENTAL TEST LABORATORY

REV

T. R. NO. 20829  
Requested By M. JAMES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG SHEET

LOG NO. EU0813  
By: P. TUREK  
Date 5-17-88  
Test No. 6216-044

TYPE of TEST: C-130 PRE/POST EMI RESULTS

UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C

SERNO \_\_\_\_\_

REFERENCE LOG NO'S.: EU0443, EU0444 AND EU0717, EU0718

POWER LINE IDENT	PHOTO NO.	SCNS DELTA	FREQ. RANGE MHZ
ØC RT. HD.	K1	UP TO 7dB HIGHER FROM .25 MHZ TO 1 MHZ	.1 TO 1
	K2	HIGHER BY UP TO 12dB FROM 3.7 MHZ TO 5.5 MHZ	1 TO 10
	K3	SIMILAR (NOTE) 29 MHZ PRESENT IN BOTH PRE AND POST RUNS	10 TO 30
ØA LFT. HD.	L1	SIMILAR	.1 TO 1
	L2	SIMILAR	1 TO 10
	L3	HIGHER BY 6dB AROUND 29 MHZ	10 TO 30
ØB LFT. HD.	M1	SIMILAR	.1 TO 1
	M2	10dB GREATER FROM 2 TO 4 MHZ AND 6 TO 9 MHZ	1 TO 10
	M3	SIMILAR	10 TO 30

SIGNIFICANT RESULTS: \_\_\_\_\_

 **SMITHS INDUSTRIES**  
**SLI AVIONIC SYSTEMS CORP.**

4141 Eastern Ave. S.E., Grand Rapids, MI 49518-8727

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SHEET



ENVIRONMENTAL TEST LABORATORY

REV

T. R. NO. 20829  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

LOG SHEET

LOG NO. EU0815  
By: P. TUREK  
Date 5-17-88  
Test No. 6216-044

TYPE of TEST: C-130 PRE/POST EMI RESULTS

UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C SERNO \_\_\_\_\_

REFERENCE LOG NO'S.: EU0445, EU0446 AND EU0719, EU0720

ANTENNA LOCATION	PHOTO NO.	SCNS DELTA	FREQ. RANGE MHZ
PILOTS STATION	P1	SIMILAR EXCEPT FOR 12dB PEAKING AT .65 MHZ	.1 TO 1
	P2	SIMILAR EXCEPT FOR 32dB PEAKING AT 9.2 MHZ	1 TO 10
	P3	SAME EXCEPT FOR 10dB RISE AROUND 29 MHZ	10 TO 30
PILOTS STATION AMBIENT	Q1	SIMILAR	.1 TO 1
	Q2	SIMILAR EXCEPT FOR 30dB PEAKING AROUND 9.2 MHZ	1 TO 10
	Q3	POST LOWER BY UP TO 15dB FROM 12 TO 18 MHZ	10 TO 30
CO-PILOTS STATION	R1	SIMILAR EXCEPT 10dB HIGHER AROUND .85 MHZ	.1 TO 1
	R2	UP TO 17dB HIGHER FROM 1 TO 10 MHZ	1 TO 10
	R3	UP TO 20dB HIGHER FROM 10 TO 30 MHZ	10 TO 30

SIGNIFICANT RESULTS: \_\_\_\_\_



SMITHS INDUSTRIES  
SLI AVIONIC SYSTEMS CORP.

4141 Eastern Ave. S.E., Grand Rapids, MI 49518-8727

SIZE

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CAGE CODE

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DOCUMENT NO.

SHEET

## REV

T. R. NO. 20829  
Requested By M. JANES  
Test Spec. ED 1309  
Checked \_\_\_\_\_

# LOG SHEET

LOG NO. EU0816  
By: P. TUREK  
Date 5-17-88  
Test No. 6216-044

TYPE of TEST: C-130 PRE/POST EMI RESULTS  
UNIT NOMENCLATURE: SLI MODEL 6216A 6216B 6216C SERNO             
REFERENCE LOG NO'S.: E40447, E40448 AND E40721, E40722

ANTENNA LOCATION	PHOTO NO.	SCNS DELTA	FREQ. RANGE MHZ
NAVIGATORS STATION	S1	SIMILAR EXCEPT 12dB HIGHER AROUND .63 MHZ	.1 TO 1
	S2	5dB CHANGES EXCEPT HIGHER BY 13dB AT 9.2 MHZ	1 TO 10
	S3	8 TO 10dB FLUCTUATIONS	10 TO 30
RT. HD. U DECK OUTBD.	T1	SIMILAR EXCEPT PRE HIGHER AROUND .63 MHZ BY 15dB	.1 TO 1
	T2	40dB HIGHER 1 TO 2 MHZ AND UP TO 10dB LOWER FROM 6 TO 9 MHZ	1 TO 10
	T3	UP TO 20dB LOWER FROM 16 TO 25 MHZ	10 TO 30
RT. HD. U DECK INBD.	U1	SIMILAR	.1 TO 1
	U2	SIMILAR EXCEPT HIGHER AROUND 9.2 MHZ BY UP TO 14dB	1 TO 10
	U3	SIMILAR EXCEPT PRE HIGHER BY UP 25dB AT 29 MHZ	10 TO 30

SIGNIFICANT RESULTS: \_\_\_\_\_

# Functional Compatibility Test Matrix

VICTIMS

NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	12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